DOCUMENT RESUME

ED 452 502 CS 014 365

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TITLE Reading Deficiencies: A Roadblock to Success.
PUB DATE 2001-05-00
NOTE 93p.; Master of Arts Action Research Project, Saint Xavier University and IRI/SkyLight Professional Development.
PUB TYPE Dissertations/Theses (040)
EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Action Research; Grade 8; *Instructional Effectiveness; Junior High Schools; *Reading Achievement; *Reading Comprehension; *Reading Improvement; Reading Instruction; Reading Strategies; *Vocabulary Development; Word Recognition

ABSTRACT

This action research project focused on causes for reading deficiencies of the targeted eighth grade students and how those deficiencies affect students' achievement in language arts, science, and mathematics. The targeted population consisted of 30 eighth grade students in a middle-class community located in a suburban area of a large Midwestern city. The problem of declining reading performance, and its impact on content area subjects, was evidenced by a decline in reading scores on the State Standards Achievement Test, a survey of targeted students, and an interview of students by the teacher researchers. Primary causes were identified as the lack of students' ability to identify and define unfamiliar words and a reading rate that fell short of eighth grade academic demands. Secondary causes were a lack of student practice and poor motivation as it pertains to reading. An intervention strategy was devised. The plan involved the teacher researchers in the subjects of language arts, science, and mathematics. The intervention strategies devised to address the word-recognition issue were as follows: introduce new vocabulary; and to teach strategies which use contextual clues to define the meaning of unfamiliar words. The intervention strategies devised to improve reading rate and comprehension were as follows: (1) provide students with practice; (2) teach strategies for determining and rewording definitions of unfamiliar words in factual readings; (3) administer timed reading quizzes in both science and mathematics; (4) administer follow-up comprehension checks after science and mathematics quizzes; (5) encourage outside reading to improve both vocabulary and reading rate; and (6) model good reading methodology. Post-intervention data indicated that students had learned and were now using strategies to define unknown words in context. This strategy, when practiced, positively impacted student comprehension, particularly in the content areas of mathematics and science. However, because the time frame was short, a measurable increase in the reading rate was not noted. (Contains 46 references, a table, and 20 figures of data. Appendixes contain survey instruments and numerous vocabulary and comprehension tests.) (RS)

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ED 452 502

READING DEFICIENCIES; A ROADBLOCK TO SUCCESS

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An Action Research Project Submitted to the Graduate Faculty of the

School of Education in Partial Fulfillment of the

Requirements for the Degree of Master of Arts in Teaching and Leadership

Saint Xavier University & IRI/Skylight

Field-Based Masters Program

Chicago, Illinois

May, 2001

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Abstract

This action research project focused on causes for reading deficiencies of the targeted eighth grade students and how those deficiencies affect students' achievement in language arts, science, and mathematics. The targeted population consisted of 30 eighth grade students in a middle-class community located in a suburban area of a large Midwestern city. The problem of declining reading performance, and its impact on content area subjects, was evidenced by a decline in reading scores on the State Standards Achievement Test, Timed Readings rate tests (Spargo, 1989), Six-Way Paragraph skills tests (Pauk, 2000), a survey of targeted students, and an interview of students by the teacher researchers.

The study and analysis of data collected has led to a list of probable causes. Primary causes were identified as the lack of students' ability to identify and define unfamiliar words and a reading rate that fell short of eighth grade academic demands. Both of these factors affected overall comprehension in science and mathematics. Secondary causes were a lack of student practice and poor motivation as it pertains to reading.

After study and analysis of the identified problems of a deficient reading rate and difficulty defining unfamiliar words in context, followed by a review of literature by experts in the field of reading, an intervention strategy was devised. The plan involved the teacher researchers in the subjects of language arts, science, and mathematics. The intervention strategies devised to address the word recognition issue were as follows: (a) introduce new vocabulary, and (b) teach strategies to use contextual clues to define the meaning of unfamiliar words. The intervention strategies devised to improve reading rate and comprehension were as follows: (a) provide student with practice, (b) teach strategies for determining and rewording definitions of unfamiliar words in factual readings, (c) administer timed reading quizzes in both science and mathematics, (d) administer follow-up comprehension checks after science and mathematics quizzes, (e) encourage outside reading to improve both vocabulary and reading rate, and (f) model good reading methodology.

Post intervention data indicated that students had learned and were now using strategies to define unknown words in context. This strategy, when practiced, positively impacted student comprehension, particularly in the content areas of mathematics and science. The students demonstrated an awareness of the impact of outside reading on the development of vocabulary and on increasing reading rate. However, because the time frame was short, a measurable increase in reading rate was not noted.

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CHAPTER 1

PROBLEM STATEMENT AND CONTENT

General Statement of the Problem

The students in the targeted eighth grade class were demonstrating some difficulty in reading achievement which adversely affected their performance in the content based subjects of science and mathematics. Evidence for the existence of the problem included the following: (a) a decline in composite scores on the Illinois Standards Achievement Tests, (b) deficiencies in specific reading skills as noted by the administration of Six-Way Paragraph reading skills inventory (Pauk, 2000), (c) deficiencies as noted by the administration of Timed Readings rate inventory (Spargo, 1989), (d) interviews of students by teacher researchers, and surveys of targeted students.

Immediate Problem Context

The targeted school was in an elementary school district composed of two junior high schools and six elementary schools. Three of the elementary buildings fed one junior high, and the remaining three fed the other junior high. There were 4,739 students in the district; 803 of whom were enrolled at the targeted junior high. The junior high was composed of sixth, seventh, and eighth grade students with an average class size of 29 students. There were 10 sixth grade classes, 10 seventh grade classes, and 10 eighth grade classes, and each grade was divided into two academic teams (State School Report Card, 1999).

The student population was fairly homogeneous with the racial-ethnic background of the students being almost entirely White (94.9%). The remainder of the students were Black

(0.5%), Hispanic (3.1%), Asian/Pacific Islander (1.1%), or Native American (0.5%). The number of students who fell into the category of "Limited-English-Proficient" was 0.8%, which was lower than the district average of 1.5% (State School Report Card, 1999).

The schools attendance rate was 96%, which was the same as the district average. Truancy was not an issue, as both our school rate and district rate were zero (State School Report Card, 1999).

The school had 53 classroom teachers and certified support staff members employed on a full time basis and four employed on a part time basis; 47 were female and 10 were male. The certified support staff consisted of a psychologist, a counselor, a social worker, a nurse, a media director, a reading specialist, two speech therapists, and five special education teachers. Not included in the above numbers were staff members who were shared with the other junior high in the district. They included a gifted coordinator, a band director, a chorus director, and a technology specialist. The uncertified staff consisted of miscellaneous office personnel and 17 teachers' aides who worked directly with the children. The building was administered by a principal and an assistant principal who functioned as a dean.

The average experience of the teachers in this school was 15.5 years, while it was 13.5 in the district. Teachers who had earned master's degrees or above were 64.7%, compared to 58.2% in the entire district.

The physical plant was 25 years old and was a two story brick structure. Because of continuous growth in the district, many additions had been added throughout the years. In fact, the school embarked on an ambitious renovation and addition project. The building, although old, was well kept and technologically well equipped with classrooms that had internet access and at least two computers. The school had two computer labs and an applied technology lab which was available to the students as a class, as well as after school hours, on a sign-up basis.

Students were heterogeneously assigned to grade level teams. Teams consisted of five core subjects; social studies, science, mathematics, reading, and English. The school operated under a modified middle school philosophy by incorporating a teaming model for student placement and by involving teachers and students in interactive team building activities. Students rotated through a series of five enrichment courses; computers, foreign language, art, music, and applied technology. Similarly, during the same time frame, they rotated through a series of five physical education/life skills courses; fitness, health, modern life skills, and two sections of regular physical education. This created an eight period day with five core subjects, two enrichment classes, and a team interaction period/lunch period. Each of the eight periods ran for 44 minutes.

Students who had needs that fell outside the parameters of the regular educational structure were served through the special education and gifted programs. Special education was delivered primarily in an inclusive manner in a regular classroom setting. However, a self-contained classroom was available for the few students whose needs could not be met in the regular classroom. Gifted students were clustered, and their curriculum was enriched by the regular classroom teacher. They also participated in pull-out activities and programs which were designed by a separate gifted coordinator (Certified Staff Handbook, 1998).

Students were assessed using the States Standards Achievement Tests. While eighth graders were tested in reading, writing, and math, seventh graders were tested in science and social studies using that test. In addition, sixth graders took the California Test of Basic Skills (CTBS)-Terra Nova test, which covered all disciplines. All students were evaluated each year by district generated tests.

The Surrounding Community

The community in which the targeted school was located consisted of 10 square miles and had a population of 44,838. The village itself had a long history; being formally incorporated in

1892. The village was primarily residential, but had tried, in the last few years, to diversify and encourage both commercial and industrial development.

The profile of its residents was, for the most part, a mix of blue collar and white collar workers who earned an average salary of $64,244, While the percent of residents with a household income below $15,000 was 7.3%. Three quarters of the available housing was single family residences. More than 96% of the population was Caucasian with a median age of 33. Of the population, the average educational level was 13 years (Local Tribune, 2000).

There were two elementary districts located in this rapidly growing, major Midwestern, metropolitan area. In the past, there existed little or no industry or commercial development to provide a good tax base for the schools. This issue was addressed by the development of industrial parks within the district and by offering tax incentives for commercial development. This lack of industrial/commercial tax base had resulted in the individual homeowner shouldering most of the schools' expenses through their property taxes. Even though the community had supported countless referendums, the per pupil expenditures were a low $4,900 as compared to the state average expenditure of $6,682.

Because of the tremendous growth in this district, three new buildings had to be erected in the past 5 years to house elementary and junior high students. Also, most of the schools had seen an addition of one sort or another. Some of the expense for these projects had been shared with the state. The district had taken advantage of a state program that was designed to address the needs of this property tax dependent community.

Besides the huge influx of new residents and the lack of dollars for education, the school district and the community faced the problems most other districts and communities faced regarding young people and education. Those issues were as follows: accountability, violence in schools, student achievement, and student readiness.

National Context of the Problem

Improving how well students read was the "most urgent task" facing American schools, said Riley, Secretary of Education, in his annual State of Education Address, on February 28, 1996 as reported by Sanchez. He observed that readings skills were at best stagnant, if not declining. He further stated that, "schools and communities must emphasize the subject more or risk sending a generation of young people into the nation's demanding job market virtually doomed to fail" (Sanchez, 1996, p, A5).

Lyon (1997) testified before the U. S. House of Representatives in Washington, D. C. with the same call to the urgency of addressing reading competency and reading education. He stated that the psychological, social, and economic consequences of reading failure are rampant. He believes that reading skills serve as the major foundation for all school-based learning, and without it, the chances for academic and career success are severely limited.

Lyon's (1997) testimony outlined three areas of concern: (a) how children learn to read, (b) why so many children have difficulty reading, and (c) how we can help children learn to read. There are several components critical to children being successful readers: (a) phoneme awareness,(b) understanding alphabetic principle, (c) fluency, and (d) comprehension. Early intervention is critical because he feels these skills, as outlined above, are time sensitive. Children with inadequate early language experience seldom catch up. Addressing these issues goes a long way towards creating good readers. As students get older and progress through the grades, Lyon feels three other components enter the reading picture. Those components are as follows: (a) comprehension strategies, (b) motivation, and (c) quality instruction.

Lewkowicz (1999) supports Lyon's thinking on what is essential for a successful reader. He sets out the same criteria as does Lyon. He addresses the following points: reading speed, reading accuracy, ability to concentrate while reading, comprehension of material, and retention of

what is read. Lewkowicz feels that testing older children's mastery requires the use of standardized tests to best predict classroom success. In his opinion, standardized tests should be used to appraise reading problems and to assess mastery of the skills. Common sense should be used in the appraisal process; recognizing that there are other variables that effect student achievement, and, therefore, other ways to assess student performance then simply through standardized tests. Some of the other things that he recognizes as important to the process would be climate, learning problems, and emotional problems that interfere with learning (Lewkowicz, 1999).

Reading is acknowledged to be the cornerstone of education and a leading factor in educational success and work related accomplishment. However, forty percent of all elementary students read below grade level as reported by the National Assessment of Educational Progress. Exacerbating the problem are what some call, "reading wars waged by academics and politicians." The wars commence over what method should be used and how accomplishments can be measured (Keller, 2000b, p. 4).

Educators are caught in the middle of the tangle of new methodology, accountability, and the the many limitations intrinsic to the educational system. The overriding questions are easy to ask, but the answers are anything but obvious. Is Johnny learning to read? How do we measure that quantitatively and qualitatively? If not, what is the best solution? Answering these questions must, and should be, the focus of all exemplary school systems.

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

In order to determine the extent of poor reading performance of the targeted eighth grade students in the content based subjects of science and mathematics and the affect these factors may have on academic achievement in science and mathematics, the teacher researchers collected data from five different sources. The State Standards Achievement Tests, Six-Way Paragraph reading skills inventory (Pauk, 2000), Timed Readings rate inventory (Spargo, 1989), student interviews, and a student survey (See Appendix B) provided the data to be analyzed.

When comparing the test data from the State Standards Achievement Tests for the previous 6 years, a downward trend in student reading scores was evident as students progressed from the sixth grade through the eighth grade. The compilation of these test results from the years 1994, 1995, 1996, 1997, and 1998 is documented in Table 1. In the year 1999, fifth grade results were substituted because of the change by the state of its targeted testing grade. This change of testing year is reflected in Table 1. Refer to Table 1 for score comparisons.

Table 1

State Standards Achievement Tests Reading Scores

Year	Grade 5	Grade 6	Grade 8
1994		291	277
1995		300	275
1996		279	256
1997		277	246
1998		291	274
1999	299		275

The State Standards Achievement Test reading scores was the first piece of data chosen to concentrate on because it provides a broad picture of student reading performance. Although this provided a larger sample of students then was concentrated on in this study, it was the first indicator of the problem. The table clearly shows that student reading scores have declined at least 14 points, and as much as 31 points, from sixth to eighth grade. This may not seem like a significant point difference, but with grade progression the state expects student reading achievement to advance and not decline from grade to grade.

The next step in this study was to assemble the target group. In order to reduce the number of variables in the study, the teacher researchers conducted an interview of students. The focus of the interviews was to determine which students had attended school in the district from the kindergarten to the eighth grade level. The completion of this process provided a fairly uniform study group as it applied to the delivery of reading instruction. All of the targeted students shared the commonality of this districts interpretation of a whole language approach to reading instruction. Although there are many components in this district's approach to the

delivery of whole language instruction, this study focused on the limited exposure to phonics instruction that these students had.

This school district's primary grade reading approach encouraged students to develop a sight vocabulary, as opposed to word recognition through the use of phonemes. The obvious disadvantage to this non phonics approach was that students could only pronounce words that they had been exposed to before. They had no way to decode or analyze unfamiliar words.

The interview resulted in a list of 78 students who had attended school in this district from the kindergarten level to the eighth grade level. From this group a class of 30 students who shared the same schedule of classes in language arts, science, and mathematics was selected. The common daily schedule of classes both reduced variables and allowed for the testing and interventions needed for this study.

After the target group was identified, each of the 30 students was given a reading survey that targeted specific reading habits. Students completed the survey anonymously, so as best to ensure the honesty of responses. In general, the survey concerned itself with reading rate, practice, and habits. A copy of the complete student survey can be found in Appendix B. Figures l, 2, 3, and 4 document the results of the student survey question by question.

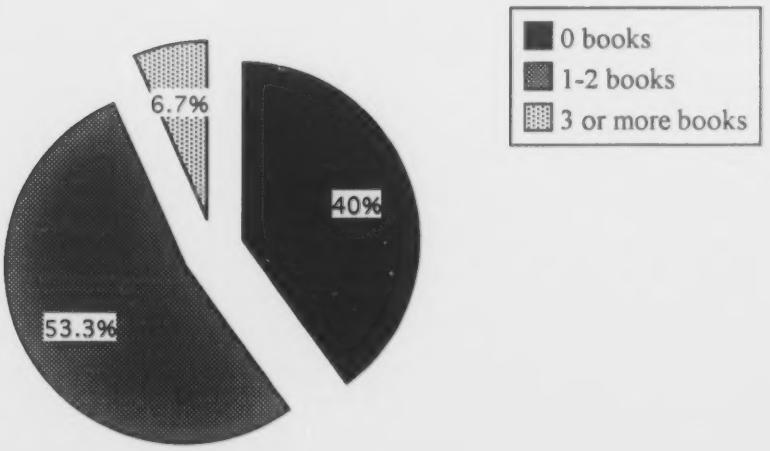

Figure 1. Student response to survey question 1. How many books have you read for enjoyment in the last two months?

In the first question of the survey, data indicated that students had limited reading practice, as evidenced by the low number of students reading three or more books. Even more striking was the fact that 12 of the respondents read no books in the last 2 months. This lack of practice would seem to have a negative impact on student reading rate and the development of vocabulary.

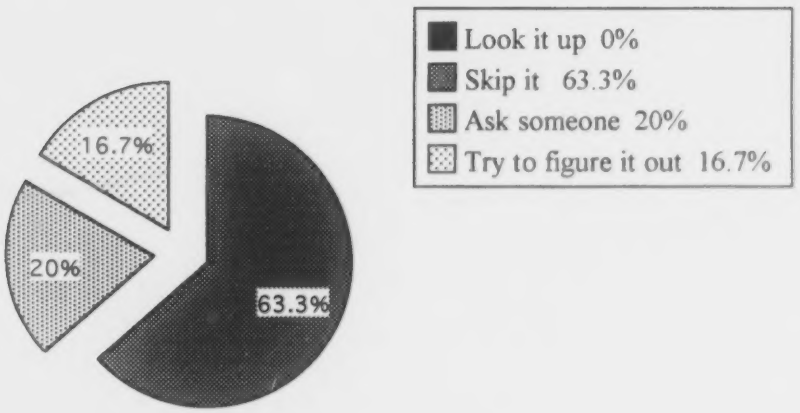

Figure 2. Student reading survey response to question 2. When you are reading and you come upon an unknown word, which of the following do you usually do?

Further, in the second question, when students were faced with a unfamiliar word, most students chose to skip the word. This calls into question the depth of their comprehension. Not one of the students surveyed selected the response "look it up" and only six would "ask someone." Only five students said that they would "try to figure it out" by using other words in the sentence as clues. It seems that using context clues to derive meaning would be a difficult task for students who are dependent on a sight vocabulary and are thereby not able to pronounce a new word.

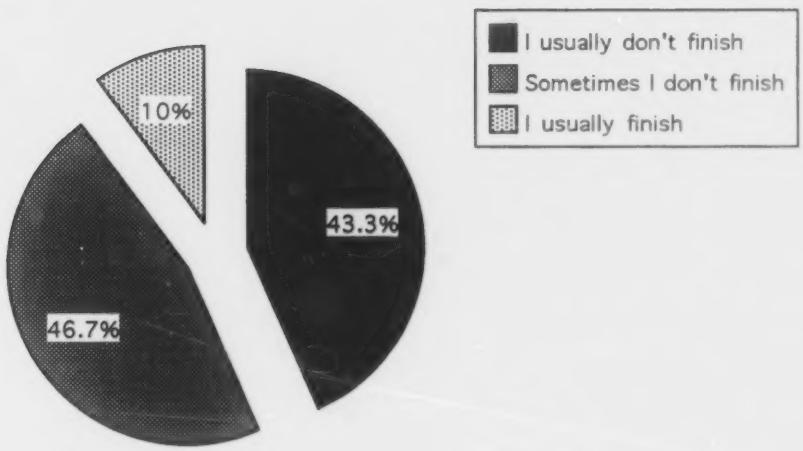

Figure 3. Student survey response to question 3. When you are given a test or reading assignment that has to be finished in class and the teacher only gives you a certain amount of time, which of the following best describes you?

Question three addresses the issue of reading rate. The rate at which students read seemed to be an area of concern, as an overwhelming majority of the students indicated a problem with completing timed assigned reading tasks. Only 3 of the 30 students surveyed indicated that they usually finished a timed assigned reading task.

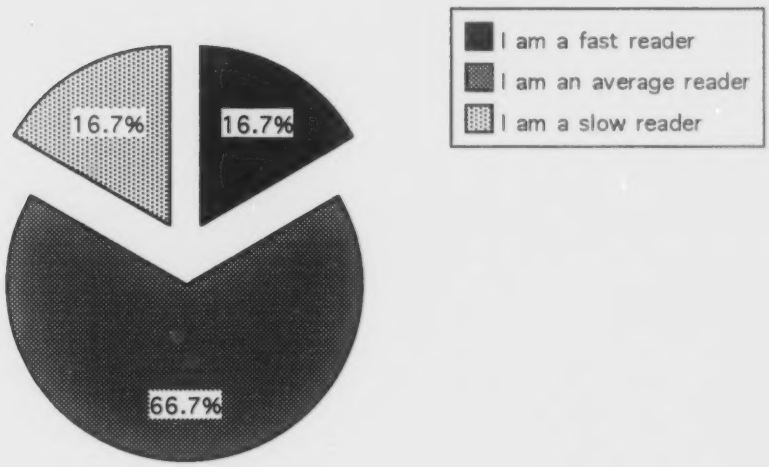

Figure 4. Student survey response to question 4. Which of these best describes you?

Question 4 results show that 25 of the 30 students surveyed felt they were only a slow or average reader.

Students' lack of reading practice, slow reading rate, and their inability to attack unfamiliar words using context clues were evidenced by this survey. The following tests, Timed Readings (Spargo, 1989), and Six-Way Paragraphs (Pauk, 2000) were used as a follow-up to the student reading survey. These two tests were used to quantify or isolate specific problem areas in reading.

The Six-Way Paragraph (Pauk, 2000) was chosen to test students' reading competency in six specific areas which were main idea, subject matter, supporting details, conclusion, clarifying devices, and vocabulary in context. This evaluating tool was particularly appropriate for our study because it focused on the reading of factual information, and, since our study was concentrating on mathematics and science reading and comprehension, it proved most useful. The passages themselves were of high interest and on an appropriate reading level for the study

group. The six specific skills that were tested by this tool were determined by the authors to be essential for the comprehension of factual material.

Three separate tests were selected from Six-Way Paragraph (Pauk, 2000) that represented the appropriate reading level of the students tested. Students in the study group were given the three tests in three separate sittings. The results of those tests are represented in Figure 5 and Figure 6. Figure 5 gives the results from the three tests separately in percentages.

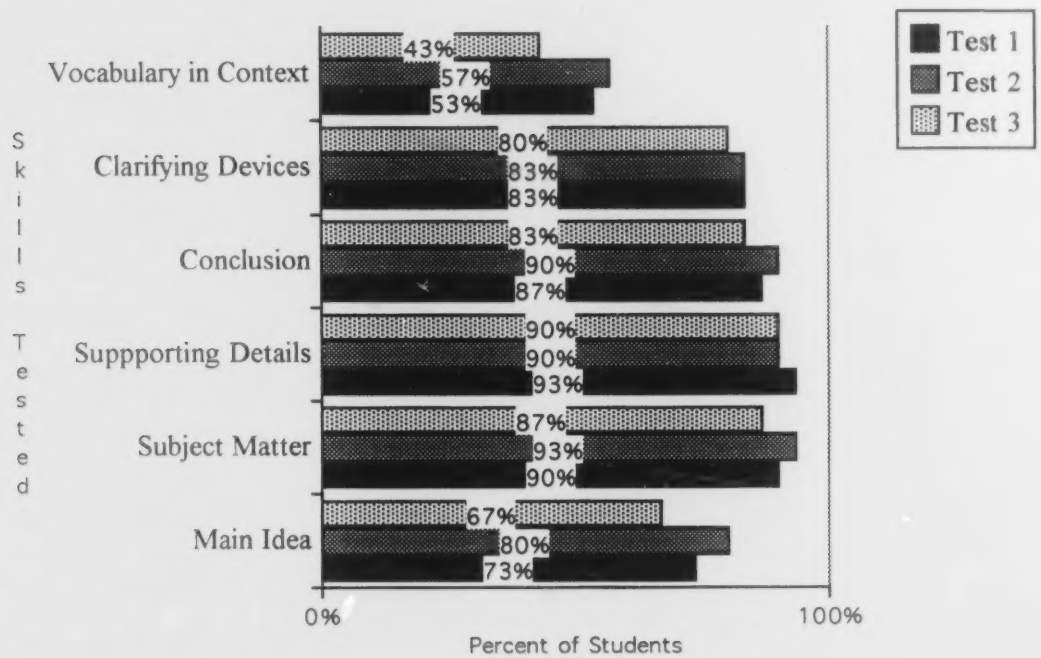

Figure 5. Comparison of skills' tests.

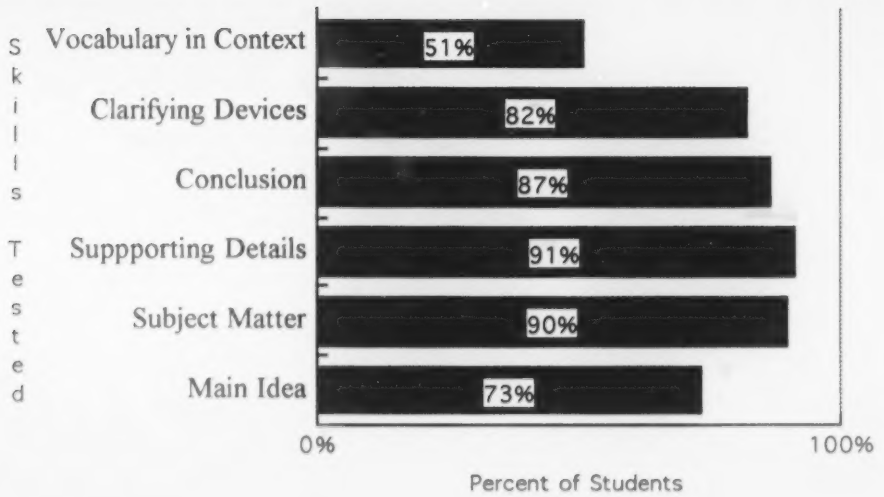

Figure 6. Total of skills tests.

Figure 6 is the average of the three skills tests.

After the analysis of Figure 5 and Figure 6, the results demonstrated a weakness in the areas of finding main idea and, particularly, in the area of identifying vocabulary in context. The inability to identify words in context was highlighted as an area of concern after the initial student survey results were analyzed. The subsequent testing of the targeted group and the analysis of the Six-Way Paragraph (Pauk, 2000) test results pointed to identifying words in context as an area of concern.

Timed Readings (Spargo, 1989) tests were selected as the testing instrument to address the concerns about students' responses on the initial student survey. Students indicated on that survey that they seldom read outside of class, and that they had difficulty completing assignments in a prescribed time frame.

Additionally, Timed Readings (Spargo, 1989) were selected as the tool we would use to determine reading rate and its impact on comprehension. The passages in this tool were short, of high interest, and at an appropriate reading level. The tests were designed to be used as a

diagnostic tool as well as a remedial tool. The philosophy of the author is that reading rate impacts comprehension because the longer it takes to read something the more disconnected readers get from total meaning.

Three separate tests were selected from the Timed Readings (Spargo, 1989) books that represented the appropriate reading level for the students being tested. The tests were administered in three separate sittings. The results of these tests are highlighted in Figure 7 that follows.

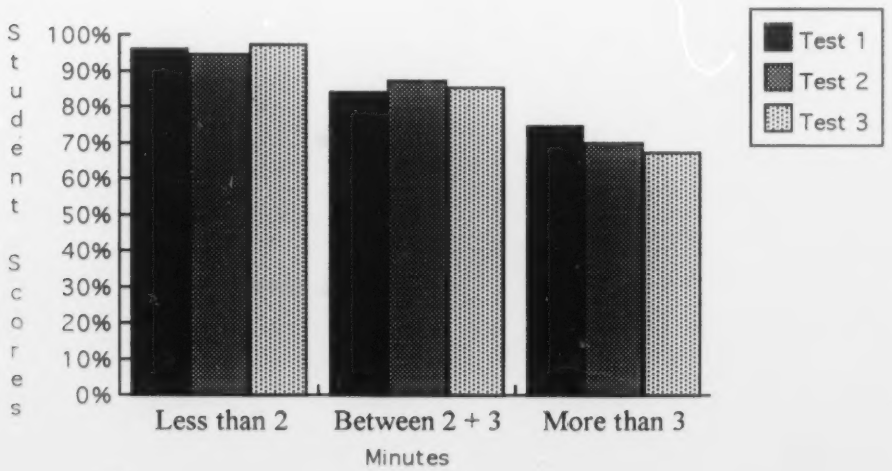

Figure 7. Comparison of the three reading rate tests.

In test 1, 7 students out of 30 finished in less than 2 minutes and averaged 96% accuracy, 15 students out of 30 finished in between 2 and 3 minutes and averaged 84% accuracy, and 8 students out of 30 finished in more than 3 minutes averaged 75% accuracy. In test 2 and 3 respectively, 8 and 7 students finished in less than 2 minutes and averaged 95% and 97% accuracy, 16 and 16 students finished in between 2 and 3 minutes and averaged 87% and 86% accuracy, 6 and 7 students taking more than 3 minutes averaged 70% and 67% accuracy.

Figure 7 illustrates that comprehension seems to be directly correlated to reading rate. Students who completed the assigned readings in less than two minutes had a higher rate of success with the comprehension questions than did students who read for two to three minutes and for those who read more than three minutes. Comprehension seems to go down proportionately as the amount of time spent on reading the passage increases.

In the content areas of science and mathematics, the teacher researchers tested the 30 students in vocabulary and comprehension to establish a baseline. This was accomplished by administering a vocabulary and comprehension test in mathematics and science. The following figures 8 and 9 show the results.

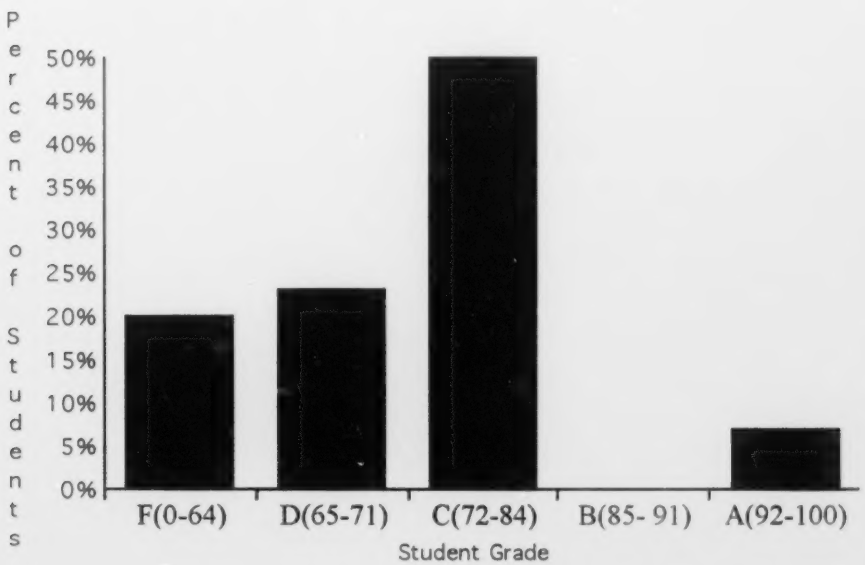

Figure 8. Mathematics baseline test.

In this test only 2 out of the 30 students scored in the A range. There were 15 students who performed in the C range, 7 in the D range, and 6 in the F range.

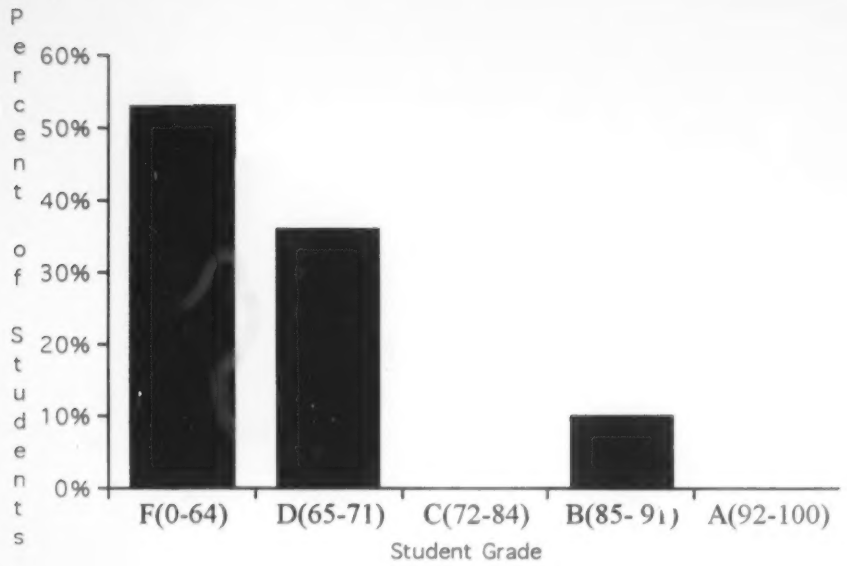

Figure 9. Science baseline test.

Of the 30 students tested, 3 scored in the B range, 11 in the D range, and 16 in the F range.

Probable Cause

After the analysis of the state test results and the subsequent conclusion that student reading scores were declining from sixth grade to eighth grades, an attempt was made to determine the reason for the decline in student reading scores over the course of the middle school years. Students were given a survey to ascertain their reading practices and their own perception of their reading skills. This was followed by the administration of the Six-Way Paragraphs reading skills inventory (Pauk, 2000), and Timed Readings reading rate inventory (Spargo, 1989). The teacher researchers then determined that the focuses of the reading study were to be as follows: (a) deficiencies in specific reading skills, comprehension, and reading rate, (b) inadequate vocabulary,

(c) absence of cross curricular reinforcement of skills and practice, and (d) lack of reading practice.

Deficiencies in Specific Reading Skills, Comprehension, and Reading Rate

Teachers in the targeted school repeatedly voiced their concerns that lengthy reading assignments were often met with student objections. Furthermore, when, and if, these assignments were completed, little comprehension took place. This lack of comprehension affected many aspects of the students' classroom performance and thereby effected the students' success. Students expressed their frustration over the amount of time involved in completing assigned readings and over the difficulty in understanding the subject matter. Due to their slow reading rates, students, when faced with an independent reading assignment, often divided the assignment and completed it in multiple sittings, which disconnected the content of the material that was read. Teachers found it difficult to determine whether students' slow reading rate, their lack of skills, or both were the problem. Although this issue of rate versus skill was addressed in formal reading class, it was usually not considered in other subject areas. This led non reading teachers to feel frustrated in being able to determine the answer to the question of rate versus skill.

When comparing the results of the three skills tests, deficiencies in two specific areas were noted, namely finding the meaning of new words using context clues and finding main idea. Forty-nine percent of the 30 students tested could not determine word meaning using context clues. Furthermore, 27% of the 30 students tested could not determine main idea. These statistics were further supported by the student survey which indicated that 63% of the students who completed the survey skipped unfamiliar words when confronted with them in text.

McMurray, Laffey, and Morgan (1979) in their study on reading found that students tend to skip over unfamiliar words in the course of their readings when they have no strategy to

rely on to determine the words pronunciation or meaning. When and if, students do make an attempt to determine meaning, students often use context clues to help determine the meaning of a word (Konopak, l988). Sometimes, however, students are not successful at making use of context clues because they lack a systematic strategy for figuring out the unknown word (Hafner, l967).

As a result of students not having a strategy for finding the meaning of unfamiliar words in context, their reading rate was adversely impacted, and, furthermore, comprehension decreased proportionately. By looking at the comparison of the three reading rate tests, students who finished in less than 2 minutes averaged 96% accuracy in comprehension of the text. Students who finished in more than 3 minutes averaged only 71% accuracy in comprehension of the text. Although the aspect of reading rate seems not to get wide attention, it is a vital component to reading comprehension. The survey of the 30 targeted students showed that 43% did not finish a timed reading assignment and 17% described themselves as slow readers. Research has shown that visual word-identification speed is both a strong indicator of reading ability and a useful predictor of later reading proficiency (Perfetti, 1985). Research suggests that reading rate may be essential to the establishment of early reading skills and might serve as a reliable diagnostic measure (Breznitz, 1997).

Inadequate Vocabulary

Deficiencies in specific reading skills hinder the comprehension of text. The ability to comprehend content vocabulary is necessary for students to successfully determine the main idea of any given passage. Specifically, the ability to comprehend content vocabulary seemed to be one key skill area that was weak. The results of the skills test verified a deficiency in vocabulary in context and in understanding the main idea; 49% of the 30 targeted students could not identify vocabulary in context, and 27% could not determine the main idea.

Furthermore, the results of the baseline vocabulary and comprehension tests given in mathematics and science supported the data collected from the reading skills tests. Specifically, the mathematics test showed that 43% of the targeted 30 students scored under 71%. On the comparable science baseline test 90% of the targeted 30 students scored under 71%. Both of these instruments clearly indicated a deficiency in vocabulary as it relates to the content areas of science and mathematics. According to Richardson and Morgan (2000) the specifics of understanding the meaning of each word in technical readings is essential to understanding the whole meaning of a passage.

A deficient vocabulary hinders reading comprehension. Students' comprehension is greatly influenced by their knowledge of vocabulary, and knowledge of vocabulary is increased the more a student reads (Booth & Hall, 1994). Skilled reading comprehension is reliant on sophisticated word knowledge. Again, the ability to decode words in a timely manner seems to impact all areas of reading. Hence, reading rate seems to suffer as a result of poor vocabulary skills and vice versa (Perfetti, 1985).

Absence of Cross Curricular Reinforcement of Skills and Practices

Middle School students find, when entering the middle school, that there is a greater demand placed on their reading skills at this level. Both the length and the complexity of reading assignments are increased (Davidson, 1990). Students are often ill prepared to make the transition from simpler text to the more complex text of middle schools, and, to complicate matters, middle school content area teachers do not have the training to ease that transition. Most content area teachers do not even envision reading instruction as a part of their job description (Gee & Forester, 1988).

Often teachers of content area subjects get caught up in the content of the text and ignore the process of reading itself. Lyon (1997) indicates that teachers in general, other than teachers

with a language emphasis, receive little formal instruction in the process of teaching reading. He further indicates that the average teacher completes only two reading courses in either undergraduate or graduate studies. Reading skills are not being reinforced across the curriculum because teachers of content based classes are ill-prepared to meet the challenges of poor readers.

New vocabulary is often not addressed in content area subjects leaving key words and concepts not defined or understood by students. This impedes the total understanding of the text material by students who, either cannot or do not, take on the task of defining new words themselves. With the absence of cross curricular reinforcement of skills and practice, students see reading skills in isolation and do not apply sound reading practice outside of reading classes.

The lack of student application of skills is evidenced by the results of the baseline tests that were administered in both science and mathematics classes. The results of those tests indicated that 43% of the targeted students in mathematics and 90% of the targeted students in science could not score above the 71st percentile on that vocabulary test. Clearly, that level of vocabulary mastery would hinder content area comprehension.

For students to become good readers and processors of the written word, they need to read and listen to these words. Those words are found in the text of content area subjects. Unfortunately, with the absence of cross curricular reinforcement of skills and practice, students see reading skills in isolation and do not apply sound reading practice outside of reading classes.

Lack of Reading Practice

One does not have to look far to find statistics that support the fact that many of our nation's children are not prepared to meet the demands or the expectations of society in regard to their ability to read. In fact, the National Assessment of Educational Progress in 1994 cited statistics that stated that, 41% of fourth graders, 31% of eighth graders and 25% of high school seniors scored below even the basic reading level (Sanchez, 1996).

The preceding statistics are indeed sobering, but when taken in the larger context of society, the implications are staggering. The statistics that follow clearly highlight the effects of illiteracy on a society at large. "Approximately 60 million U.S. citizens read below the eighth-grade reading level. About 85% of the juveniles appearing in juvenile court are functionally illiterate. Approximately 50-60% of U.S. prison inmates are functionally illiterate. About 75% of the unemployed adults are illiterate" (Miller, 1993, p. 35). As this increasingly becomes a societal issue, politicians have begun to address the lack of reading literacy as an important national issue.

Reading practice greatly impacts reading ability. Students' lack of reading practice was highlighted in the survey responses; 40% of the 30 targeted had read no books in the last 2 summer months. When questioned further about their responses students indicated that time was spent doing other activities such as: watching television, playing video games, and participating in sports. Clearly, reading was not a priority for almost one half of the the students surveyed, and more importantly students did not categorize reading as an enjoyable pastime.

Therefore, a fine line has to be drawn between the technical aspects of reading and the general enjoyment of reading. In our desire to create effective readers, we must also create willing readers; for, if it does not bring some pleasure, it will be avoided. In our desire to improve reading instruction, too much of the pleasure reading is being sidelined by an overemphasis on "drill and kill" skill instruction. Avid readers do so as a hobby because they find pleasure in the activity (Baumgartner, 2000).

Balancing the development of needed skills while making reading a joyful experience is certainly one of the challenges faced in reading instruction. If schools do not address the issue of poor readers or non readers, schools will be creating an academic no win situation for its students. Students who find no pleasure in reading, or cannot read at an acceptable level, are almost certain

to fail academically. Completing even the simplest course assignments in content area subjects becomes an impossible task because the textbooks are just too difficult (Wood, 1998).

Clearly then, finding out why students cannot read is essential to enabling students to be successful learners, and, then, determining the most effective methods to deliver consistent and meaningful instruction must follow. Sanchez reported that Education Secretary Richard Riley in his State of Education address said that, at best, reading scores were stagnant. Statistics support that many of our young people lack the most essential and basic skills. If the issue of poor reading preparedness is not a focus for our nation then we, "risk sending a generation of young people into the nation's demanding job market virtually doomed to fail" (Sanchez, 1996, p. A5).

CHAPTER 3

THE SOLUTION STRATEGY

Literature Review

Introduction

A review of the literature provided the teacher researchers with a variety of strategies that purportedly improve reading comprehension and increased vocabulary. Additionally, the review of the literature fell into several common themes. Such themes included: a) strategies for improving reading skills, comprehension, and rate, b) strategies that increase vocabulary, c) benefits of reading practice, and d) benefits of an integrated curriculum. Following is a review of the literature by knowledgeable others that targets each theme specifically.

Strategies for Improving Reading Skills, Comprehension, and Rate

There are basic skills that students need to have mastered in order for reading comprehension to occur. Stanovich (1984) pointed out in a study that in the primary school years there exists a direct correlation between decoding and comprehension and students overall reading development. He goes on to say that he considers decoding and comprehension, to be skills that are fundamental to that reading development. Lyon (1997) agrees that the first, and most obvious of the basic reading skills, is the ability to recognize and decode the written word. McMurray, Laffey, and Morgan (1979) found that when students lacked the ability to decode an unfamiliar word they skipped over the word in the text rather then look it up or ask for help. This practice severely impacted comprehension and hindered the acquisition of new vocabulary.

Simple word recognition, however, does not alone translate to reading comprehension.

Comprehension is also dependent on the mastery of other more subtle skills. Specifically, comprehension results when one draws on previous knowledge and experiences and from the possession and use of a full vocabulary. Hynd, McNish, Lay, and Fowler (1995) found that students tended to skip over entire passages that they could not confirm from their previous knowledge or experience unless their attention was specifically directed to it. Teachers play a critical role in assisting students in understanding words and in clarifying text for the reader. Most researchers agree that beginning the reading journey with early exposure to life experiences and the spoken word correlates to vocabulary development and the ability to comprehend what is read. "By and large, when children grow up in a print-rich home, where parents model reading and writing, where literacy is a tool of the day-to-day life, where stories and words are treasured, where reading aloud is a bedtime ritual, good readers usually emerge" (Daniels, Hyde, & Zemelman, 1993, p. 31).

Further, there is a need to be able to summarize, predict, and clarify the written word in context (Lyon, 1997). Clearly, teachers need to model these skills for students. Children, above all else, are good imitators, therefore, it behooves teachers to be good models. Daniels et al. (1993) suggest that teachers need to read along with their students and help them make meaning from what they read. Systematically, the teacher needs to interrupt the reading process to clarify what is read and to make sure that students understand the authors intended meaning. Additionally, teachers need to encourage students to predict what will happen next in the story. Finally, students need to be able to summarize what was read in order to process the information and to organize the information in a manner that can be stored for future experiential reference. They also points out that children need to see an adult enjoying the process of reading. This modeling encourages students and also demonstrates the mental complexity involved in meaningful reading experiences. This process is especially effective when the teacher verbalizes

the reading and how the meaning is derived. This type of adult modeling needs to be viewed often by students in order for them to be familiar enough and comfortable enough with it to internalize it. "Teachers who are good models help to ensure that schools don't just graduate students who can read, but people who do read" (Daniels et al., 1993, p. 31). This intervention can be accomplished with little training and little money. All that is needed is a little time, effort, and dedication. Reading is a complex developmental achievement calling upon many acquired skills and experiences.

Once students have mastered these basic skills, reading rate or fluency must be addressed as it applies to reading comprehension. Rate becomes increasingly important to overall comprehension as students progress through their school years. "Extensive research...has demonstrated that reading rate can function as an independent variable that influences the quality of reading performance" (Breznitz, DeMarco, & Hakerem, 1993, p. 118). Further, study and experimentation has clearly shown that an increased reading rate enhances reading performance by positively impacting decoding and comprehension. The effects of which are seen in both new student readers and older student readers (Breznitz, DeMarco, Shammi, & Hakerem, 1994).

Strategies that Increase Vocabulary

Davis and Thurstone (as cited in Richardson & Morgan, 2000) asserted that individual meanings of words were central to comprehension. Booth and Hall (1994) supported this finding and went on further to state that comprehension is directly effected by knowledge of vocabulary which, in turn, is directly effected by reading. Also, Booth and Hall noted that the older the child, generally, the better the vocabulary. They attributed this to the older child having more and varied reading experiences. Because being successfully at reading is so dependent on vocabulary, it is important that teachers directly teach the meaning of critical words before engaging the text.

Groff (1981) holds that most students need some direct instruction in regard to vocabulary before a lesson is presented. In general though, it is not enough to just present the vocabulary if students have no knowledge of the subject matter in which the words appear. The vocabulary then must be presented with regard to the context and student's personal experiences (Richardson & Morgan, 2000). Further, knowledge of a word is not always static and can change in meaning from one context to another. Kibby (1995) writes that there is a "continuum of word knowledge progressing from production knowledge to potentially learnable knowledge." (p. 209) He defines production knowledge as having the ability to incorporate a given vocabulary word in every day writings and speech, and he feels students can move towards learnable knowledge as a result of being provided with background information about a word or concept of which students are uncertain. Clearly then, many experts support that presentation of vocabulary is a vital link towards reading comprehension.

The general consensus among experts is that vocabulary can and should be discussed before, during, and after lessons. Medo and Ryder (1993) contend that vocabulary that is introduced before a lesson, without regard to an individual student's reading ability, will foster better comprehension. Reading research also holds that it is just as beneficial to teach reading during the lesson and after the lesson as before (Mealey & Konopak, 1990; & Memory, 1990). They further clarify their findings by stating that students need initially to try find meaning at the onset, to think through meaning as they read, and to reflect on meaning at the end. They feel that this is the only way true meaning is established and retained.

Teachers then need to create lessons that will guide students through the vocabulary in any given text. Ryder and Graves (1994) contend that basal texts usually only address the issue of vocabulary as a prereading exercise and do not consider vocabulary during or after reading. Carver (1994) found that if teachers allow students to read at school or at home without

vocabulary guidance, teachers should not expect a noticeable growth in vocabulary.

When students do engage in unguided readings they need to have some strategy for determining the meaning of unfamiliar words; otherwise they tend to skip over any unfamiliar words (McMurray, Laffy, & Morgan 1979). Students need to be taught how to determine the meaning of unfamiliar words using context clues (Hafner, 1967). Hafner suggests that there are six clues that students can be taught to look for, and they are as follows: words defined within the context of the sentence, signal word which warn the reader of further information to follow, direct explanations, synonyms, antonyms, and inferences. Supporting this concept is Stahl (1986) who contends that students on their own can determine the meaning of unfamiliar words using these strategies. It would be beneficial then for all teachers to be comfortable with the use of these concepts in order to guide students to be better independent readers.

Benefits of an Integrated Curriculum

Student reading achievement and overall academic achievement would certainly benefit from increased teacher training in the area of reading instruction. Experts contend that studies and surveys indicate that teachers are wholly unprepared for the task of teaching the reading process or strategies. Lyon (1997) states that most teachers who are not directly connected to a reading or language course of study in college have only two reading or language courses during their graduate or undergraduate years of study. Further, they have had no training in detecting, diagnosing, or remedying reading problems among their students. As a result, teachers of content based subjects are method driven rather than being able to address the reading skills in the context of their specific discipline. Lyon goes on to state that most educators agree that teachers need to be trained better in reading methodology in order to foster greater student success in their classrooms.

In the meantime, schools need to thoughtfully investigate in-house solutions to the lack of

formal teacher training in the area of reading instruction. Many researchers point out areas that all teachers can be educated in regarding reading instruction to help foster better reading performance. The general consensus among researchers is that teachers can immediately incorporate several practices to benefit reading in their content area without much training, and they are as follows: making materials that are read relevant and engaging, modeling of good reading habits, displaying an enthusiasm for reading, and providing opportunities for students to read and discuss what is read. Presenting vocabulary would be another of the easily doable interventions that all teachers could and should incorporate into lessons. The benefits of this strategy were addressed at great lengths in the preceding section.

Content area teachers should be concerned about the appropriateness of the materials selected for students to read; again speaking to its relevance and its ability to engage the reader. At the same time, material that is at the appropriate grade level is critical to increasing fluency. Appropriate material is defined as text that can be read with 95% accuracy in word recognition (Betts, 1954). Ley, Shaer, and Dismukes (1994) said that there are two areas to consider when analyzing for appropriateness, and they are the interest level of the material and the readability of the material. These researchers believe that one of the consequences of not taking these points into consideration is that by the time students get to the middle school years, they have lost interest in reading. They lose interest because of repeated failures to comprehend such materials in preceding years (Worthy, 1986). It has been noted by Guthrie, Alao, and Rhinehart (1997) that students, by the time they reach junior school, read mainly for grades or recognition by the teacher, rather than for any real desire to learn.

Teachers need to read orally and with enthusiasm to students to demonstrate good reading practice. They need to pause during these reading to allow for prediction, summarizing, and reflection (Lyon, 1997). Effective students possess these skills and are able to use them in any

setting; not just a structured reading class (McMurray, Laffy, & Morgan, 1979).

In depth discussion of what is read is critical to ensuring comprehension. Youngsters are intrinsically motivated to read when the material is significant to them and the concepts are recognizable (Maples, 1994). Teachers of content area subjects need to coordinate themes and skills covered so that students see the whole rather than just parts. Basically, all teachers need to see themselves as reading teachers to some extent.

Benefits of Reading Practice

Reading practice is a critical element in the reading process. Clearly, reading practice impacts comprehension by increasing reading rate, by the development of vocabulary, and by expanding our general knowledge and experiences. "Reading itself promotes reading" (Pfau, 1997, p. 35). Students need to be provided with the opportunity and encouragement to read. By engaging in the process itself, we almost have no choice but to develop literacy. One would be hard pressed to find a well-read person who has serious problems with writing, grammar, vocabulary, or comprehension (Kashen, 1993).

Teachers must foster a positive attitude towards reading and encourage reluctant readers. Students should be exposed to a wide variety of reading material to provide different experiences and to help students find their areas of interest. All readers, but especially struggling readers, should be given time in the course of their school day to experience both structured and unstructured reading time (Wood, 1998). Teachers need to ensure that reading instruction is a critical component of their lesson design so as to impart that the results of reading are both rewarding and interesting (Richardson, 1995). Anderson, Hiebert, Scott, and Wilkerson (1985) encourage schools to set aside 2 hours per day for independent reading in the elementary school. They acknowledge that this amount of time might be hard to meet in the upper grades. They suggest that the time issue be addressed by having some of those minutes met in content area

classes as well as regular language classes. This reading becomes more meaningful if it is a part of an interdisciplinary unit that integrates literature into other content areas.

The community at-large shares the responsibility to see that students are provided with a rich and nurturing reading environment. "The crucial role of home experience in the development of effective readers is well documented and had been widely publicized in the professional and popular press" (Daniels et al., 1993, p. 31). Good modeling of reading by parents and others outside of the school environment demonstrates both the pleasure and importance of reading. Parents need to encourage students to use the libraries, to purchase books, and to have literature available in their homes.

Surprisingly, from kindergarten to 12th grade student only spend 9% of their time in school, which leaves another 91% of time spent out of school (Kearns, 1993). This makes parents and the community as a whole responsible for much of student literacy. Clearly then, schools and parents must work together to that end (Johns, & Lenski, 1997).

Project Objectives and Processes

As a result of an increased emphasis on, and a teaching of strategies for defining unfamiliar words in context in language arts, science, and mathematics classes, during the period of August 28, 2000 to December 12, 2000, the 30 eighth grade students will demonstrate a noticeable advancement in comprehension and vocabulary as measured by timed comprehension and reading rate tests, teacher generated tests, and teacher observations.

In order to accomplish the terminal objective the following processes are necessary:

1. Strategies for finding meaning of words using context clues.
2. New vocabulary will be introduced and discussed before reading.
3. Strategies that increase vocabulary will be emphasized.

Project Action Plan

8/ 29
Distribute parent permission letter to the 30 students in study.

9/ 4 and 9/ 5
Analyze results of the 1999-2000 Illinois Student Achievement Test.

9/7
Conduct oral student survey regarding attendance of school during the grades K-7.

9/7-9/8
Administer and analyze written student survey regarding reading practices.

9/ 11-9/15
Administer three timed reading rate tests in language arts class.
Administer three timed reading skills tests in language arts class.

9/12
Administer baseline vocabulary and comprehension tests in mathematics and science.

9/18-1/ 30
Model good reading practices in language arts, mathematics and science classes.
* Students will be made aware of the importance of reading to increase vocabulary and reading rate, and encouraged to read outside of the classroom setting.
* New vocabulary will be emphasized by the use of cloze, two column note taking, and word maps.

9/18-9/20
Review data collected from student timed reading tests in language arts class.

9/18-12/21
Teach strategies for defining words in context using teacher generated worksheet in language arts class, and administer follow-up check test.
Teach strategies for improving comprehension and vocabulary in mathematics and science.

10/16 -12/ 21
Administer four vocabulary and comprehension tests in mathematics and science.

12/ 21- 1/ 11
Analyze and compare baseline science and mathematics vocabulary and comprehension tests with four subsequent tests.

1/11- 1/ 14
Conduct final reading student survey.
Administer final reading rate test and reading skill test.

1/ 15- 1/ 30
Analyze and compare results from all reading rate and skill tests.
Analyze and compare initial student survey to final student survey.

2/ 1- 3/15
Quantify and publish results.

The three members of the action research team will individually carry out the specific curricular aspects of the action plan. Jo Ann Binotti will administer all reading tests in Language Arts class, JoAnne Hamilton-Gunkel will administer all science aspects of the plan, and Dorothy Sipple will conduct the mathematical portion of the plan. All other tasks will be carried out by the three members of the research team as a team.

Methods of Assessment

In order to assess the effects of the interventions, several tests will be administered. They are as follows: (a) timed reading comprehension tests, (b) timed reading rate tests, and (c) teacher generated tests. Further, teacher observations of increased reading proficiency will be noted during the intervention period. A follow-up survey detailing student reading habits and practices will be administered.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Intervention

The objective of this project was to increase student reading achievement and performance in the content based subjects of science and mathematics. In order to affect these changes, interventions were implemented as follows: (a) administration of a baseline vocabulary and comprehension test in science, which is found in Appendix C; (b) the administration of a baseline vocabulary and comprehension test in mathematics, which is found in Appendix D; (c) the teaching of strategies for defining words in context using worksheets which is found in Appendix E; (d) the introduction of and teaching of new vocabulary in science and mathematics before readings; (e) the administration of four vocabulary and comprehension tests in science, which are found in Appendices F; (f) the administration of four vocabulary and comprehension tests in mathematics, which are found in Appendix G; (g) the modeling of good reading habits in language arts, science and mathematics; and (h) the encouragement of students to read outside of the classroom setting to increase rate and vocabulary.

All of the interventions were conducted over a 3 month period of time starting in late September and ending on the twentieth of December. The interventions involved 30 targeted students who were selected because they had attended school, from kindergarten to eighth grade, in the district where the study took place, and because they shared a common schedule. The fact that students attended school from kindergarten to eighth grade was important because it reduced, to some extent, the variable of how reading instruction was delivered to these students in formal

reading classes. The commonality of schedule made delivery of the interventions easier for the teacher researchers.

Baseline vocabulary and comprehension tests were given in both science and mathematics classes. These tests were given in September as an initial intervention. See Appendices C and D. These tests were given without an initial vocabulary introduction or without strategies to help define these unfamiliar terms. These tests were given to determine where students stood as far as their ability to understand content based vocabulary before any direct instruction of said vocabulary took place. Results of these tests were used to quantify student competency in the area of vocabulary comprehension before interventions were introduced.

Specifically, the science baseline test consisted of three multiple choice vocabulary questions that were derived from the text of the material that students were presently studying and three multiple choice vocabulary comprehension questions that defined word from that same text. A copy of this test can be found in Appendix C. The mathematics baseline vocabulary and comprehension test consisted of six fill-in-the-blank vocabulary questions based on the unit of study in mathematics. Students were provided with a word bank of terms that they could use to fill in those blanks. A copy of this test can be found in Appendix D.

After the baseline tests were administered, the targeted students spent language arts class time developing and learning strategies to help define words using context clues. These four separate interventions took place from September eighteenth to the twenty-first of September. The students were asked to underline words in the sentences provided, and these underlined words aided in the defining of specific unknown words. The words that were presented in these lesson followed a specific theme, such as government words or science words in context. The purpose of presenting a technical vocabulary was to reinforce the teaching of words from content

based subjects. Students were then asked to define the underlined word in their own words using the context clues that they pointed out through the underlining process. Using this information students completed the attached work sheet which demonstrated their understanding of the new word. The work sheets consisted of 15 to 20 question that were either fill-in-the-blank or finding a synonym for the vocabulary word. In both cases, a word bank of four word choices was provided. The work sheets appear in Appendix E.

During roughly the same time frame, teachers in science and mathematics began to introduce new vocabulary before each lesson and to reinforce strategies for determining the meaning of words in context. Further, the teacher researchers continued to help students determine word meaning throughout the readings and to reflect on meaning at the end of the readings. Specifically, in science classes the teacher modeled good reading practices by reading aloud and intermittently asking students to select vocabulary words from the readings that they did not understand. Then, together, the teacher and the students developed definitions for these words based on previous experience or other information that they garnered from the text that was just read. From that, a two column note taking strategy was completed by each individual. Each student put the new vocabulary word in the first column and then derived a definition in the second column. This created a study guide to the new vocabulary that was presented. This study guide was a reference tool that was used before, during, and after the unit or section of science was studied. Supplementing the two column note strategy was the creation of a cloze based on the vocabulary. The presentation of this cloze occurred either before or after the formal presentation of the unit of study. After the presentation of these new words and strategies students were asked to complete a science vocabulary and comprehension tests. These tests can be found in Appendix F.

Simultaneously, in mathematics vocabulary was also being addressed. Good reading

practices were modeled by the teacher research, mathematics instructor. The teacher read through the lesson of study with the students pausing, to point out new vocabulary words to students. Students were then asked to reword the new vocabulary words using past knowledge or context clues to create a more easily understood definition for the new vocabulary word. Students then entered these definitions into a section of their mathematics notebook that was dedicated to new vocabulary. They entered these words using the two column format with the new vocabulary word on the left and the derived definition on the right. These new words were referred to during and after the lesson of study. When appropriate, additional strategies were used to increase understanding of vocabulary and comprehension of concepts such as: word maps, journals, reflections, and mnemonic devices. At the culmination of each of the lessons students completed a test of new vocabulary. These tests had a variety of formats. The formats were as follows: matching, cloze, true and false, or fill-in-the-blank. These test can be found in Appendix G.

Finally, the mathematics, science, and language arts teachers, throughout the intervention period, modeled good reading habits and practice; demonstrating to students that comprehension was dependent on the understanding of all word in the the text. Further, during oral reading, students were encouraged, where appropriate, to stop to summarize, restate, and reflect on the readings. Students were given in class time to read. Students were also encouraged to read outside of class to enhance vocabulary development so as to increase reading rate and positively impact comprehension.

Presentation and Analysis of Results

In order to assess how well students learned strategies for defining unknown words using context clues, a graph was created to quantify student responses to follow-up comprehension

questions from four language arts work sheets. The following statistics that appear in figure 10 represent a composite score of the four work sheets.

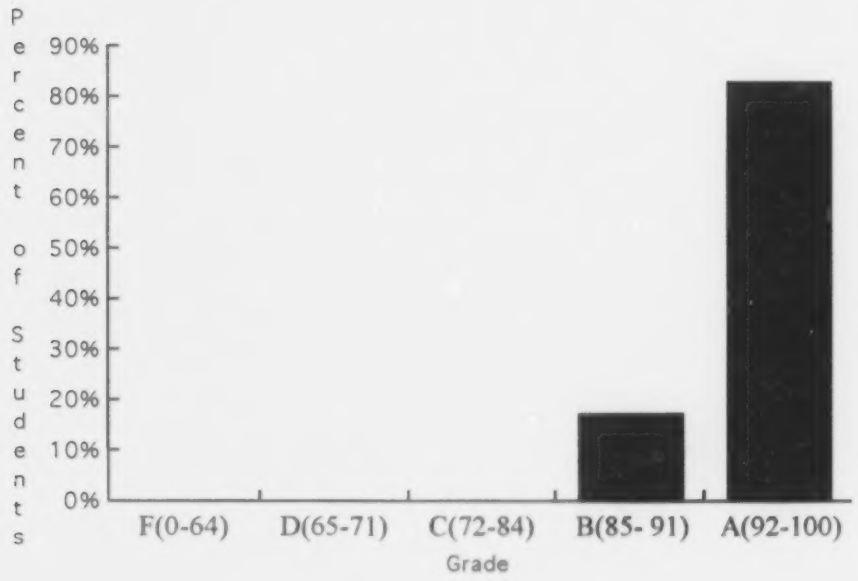

Figure 10. Language Arts context clue worksheets composite.

The intervention appears to indicate that 17% of the students performed in the B grade range and that 83% performed in the A grade range. This graph appears to indicate that the students involved in this intervention demonstrated the ability to determine meaning of unknown words using context clues. Even from the start of the interventions, students demonstrated consistent competency.

In order to assess the effects of the presentation of critical vocabulary before reading was begun in science classes, a graph was generated by comparing student progress from the baseline vocabulary and comprehension test to the final vocabulary and comprehension test. Figure 11, which follows, illustrates those results.

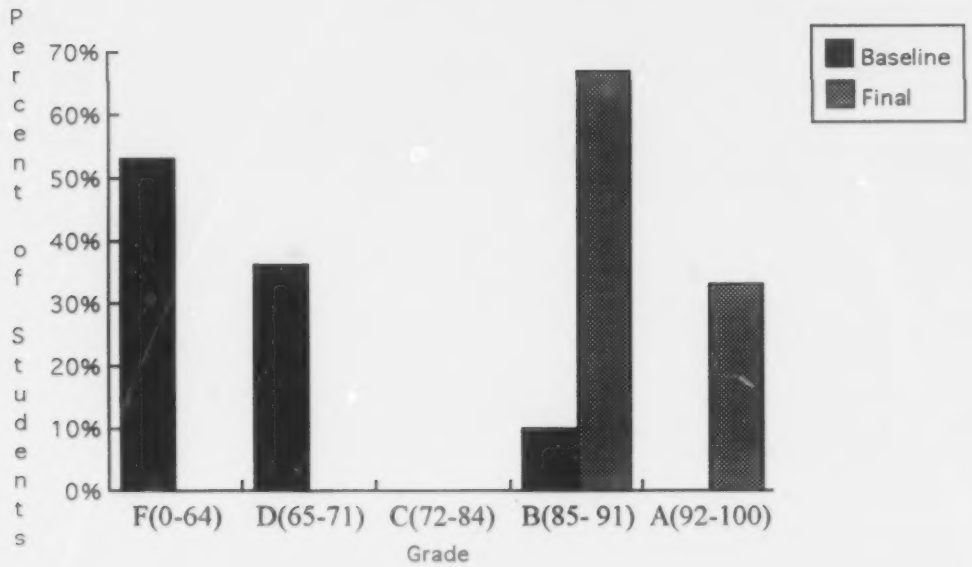

Figure 11. Comparison of science baseline vocabulary and comprehension test to the final science vocabulary and comprehension test.

The graph appears to indicate that the presentation of vocabulary before students read had a positive effect on student performance on comprehension check tests. Ninety percent of the targeted students performed at an F or D level on the baseline test before any intervention was tried. Figure 11 indicates that student performance rose to 100% of them scoring in the A and B range after the students were presented the vocabulary before reading commenced.

In order to assess the effects of the presentation of critical vocabulary before lessons were presented in mathematics classes, a graph was generated comparing student progress from the baseline vocabulary and comprehension test to the final vocabulary and comprehension test. Figure 12, which follows, illustrates those results.

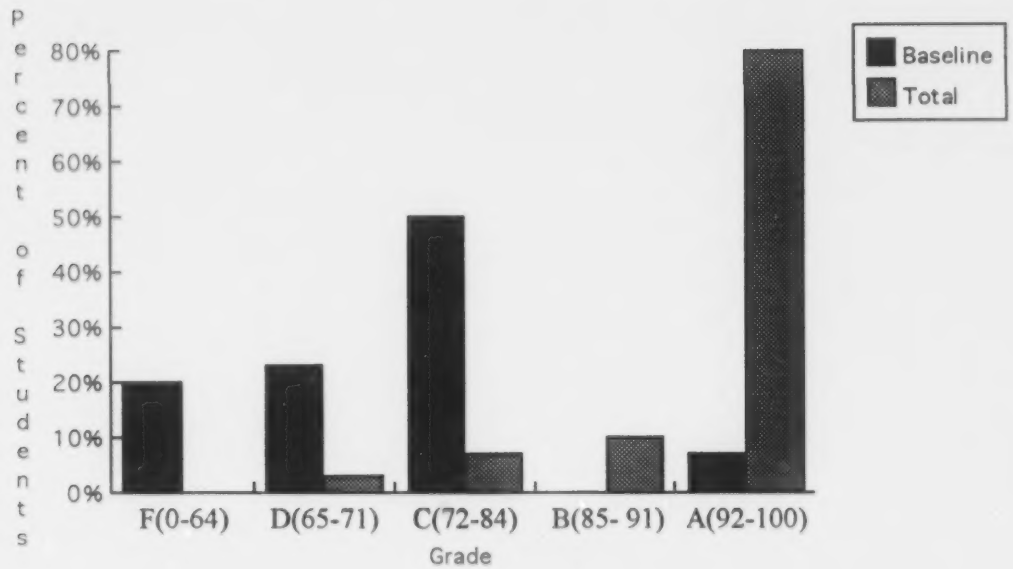

Figure 13. Comparison of mathematics baseline vocabulary and comprehension test to final mathematics vocabulary and comprehension test.

The graph appears to indicate that the presentation of vocabulary before students read had a positive effect on student performance on comprehension check tests. Ninety-three percent of the targeted students performed at the C, D, or F level on the baseline test before any interventions were tried. Figure 12 indicates that students performance rose to 90% of them scoring in the A and B range after the students were presented the vocabulary before the lesson was presented.

In order to assess the effects of presenting of vocabulary before reading, reinforcing vocabulary during and after reading, modeling good reading practices, and teaching of strategies to define words using context clue, a graph was generated that compared the total of the three initial skills tests to a single skills test that was given after the interventions. The skills that were tested

were as follows: main idea, subject matter, supporting details, conclusion, clarifying devices, and vocabulary in context. Figure 14, which follows, illustrates those results.

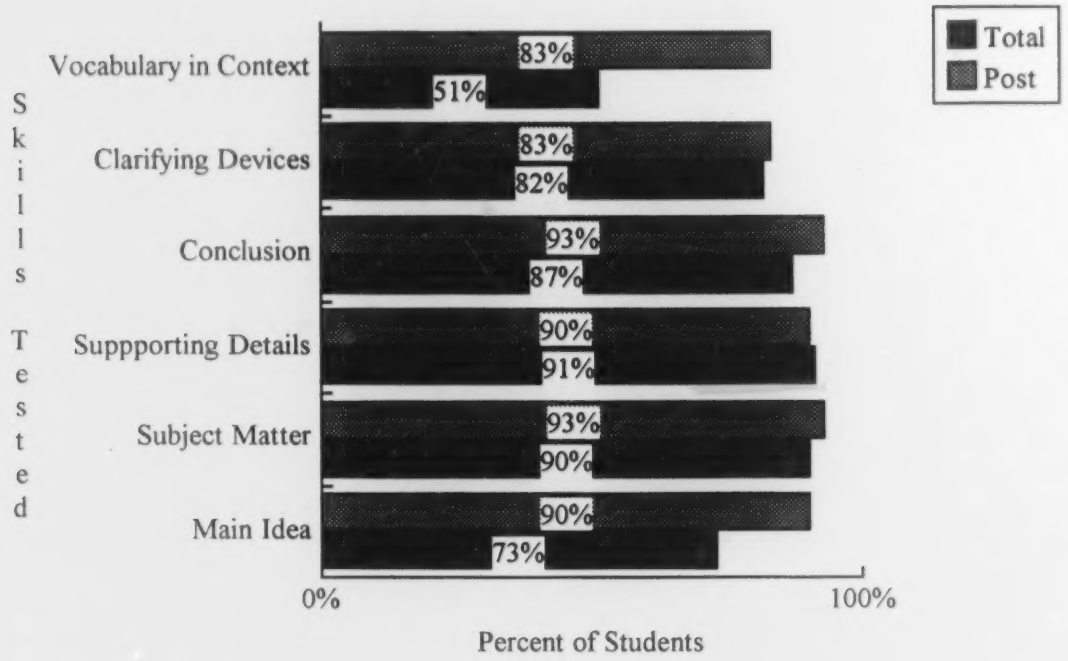

Figure 15. Comparison of the three initial skills tests total to the post skills test.

The graph appears to indicate that there was very little movement in the areas of clarifying devices, conclusions, supporting details, and subject matter. However, there was measurable advancement in the areas of vocabulary in context and main idea. Specifically, clarifying devices saw only a 1% increase, conclusions saw only a 6% increase, supporting details saw a 1% decline, and subject matter saw a 3% increase. These percents of increase or decrease seem to be insignificant when compared to the results in the areas of vocabulary in context and main idea. Vocabulary in context saw a jump of 32 percentage points and main idea saw a jump of 17 percentage points.

In order to assess the effects of presenting vocabulary before reading, reinforcing

vocabulary during and after reading, modeling good reading practices, teaching of strategies to define words using context clues, and encouraging independent reading both in and out of class, a graph was generated that compared the total of the three initial reading rate tests to a single reading rate test that was given after interventions. Figure 16, which follows, illustrates those results.

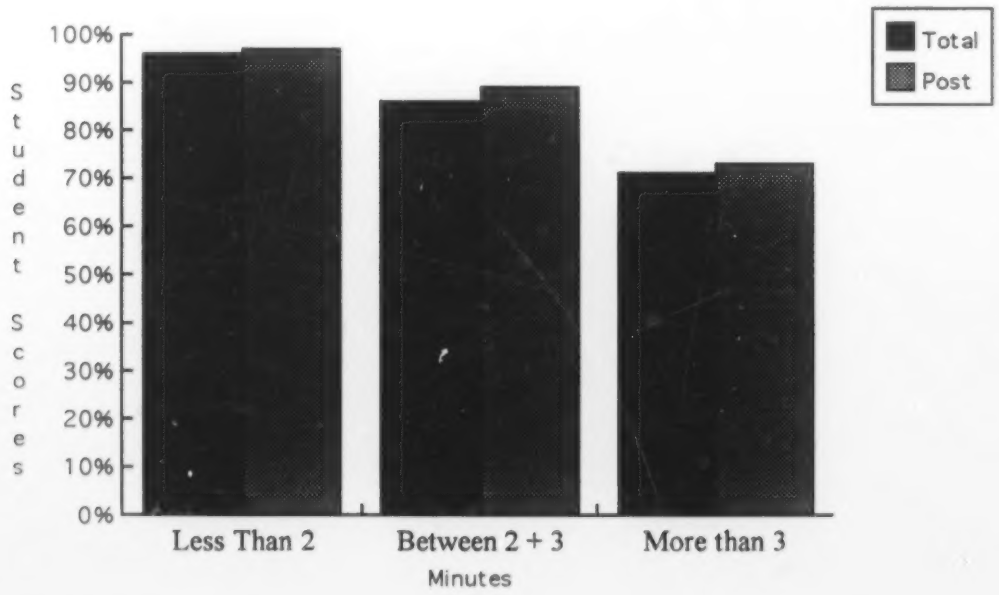

Figure 16. Comparison of the three initial reading rate tests total to the post reading rate test.

The graph appears to indicate that reading rate influenced comprehension. It appears that the faster a student read the better the comprehension. Students who read the passages in less then two minutes comprehended in the 90 percentile range, students who read in the two to three minute range scored in the 80 percentile range, and students who read in more than three minutes scored in the 70 percentile range. These figures held true for both the three initial tests and for the post test. When the data from the three initial tests was compared to the post test, little advancement was noted in reading comprehension. Statistically, the gains were insignificant to this study.

In order to assess the effects of presenting vocabulary before reading, reinforcing vocabulary during and after reading, modeling good reading practices, teaching strategies to define words in context, and encouraging independent reading both in and out of classes, a follow-up student survey was administered. The survey attempted to measure changes in practices of students in regard to the following: number of books read, the use of strategies to determine meaning of unknown words, and whether students could complete timed reading assignments. It further attempted to measure students' perception of their own reading rate. Figure 17, 18, 19, and 20, which follow, illustrates those results.

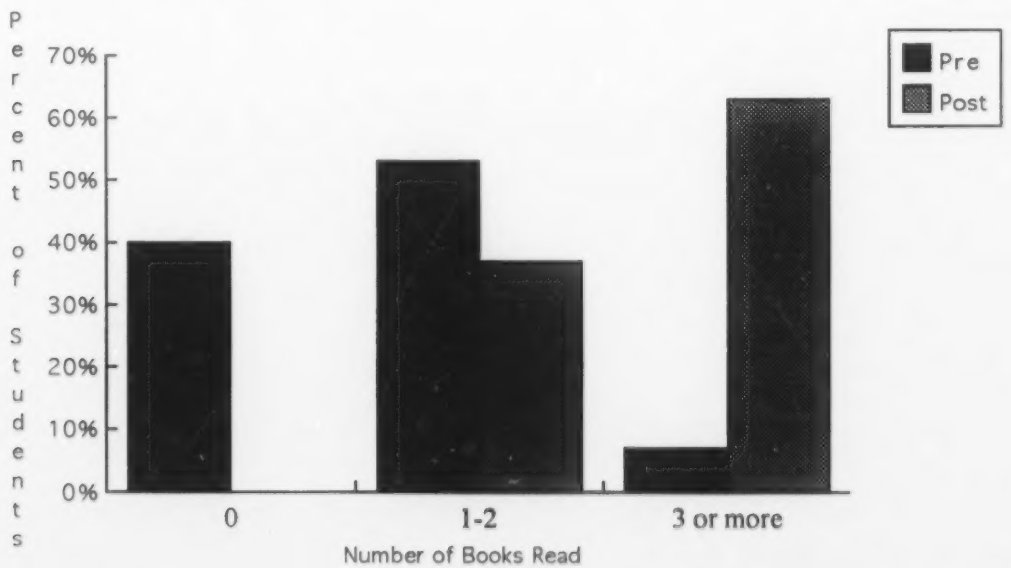

Figure 17. Student pre and post responses to survey question 1. How many books have you read for enjoyment in the last two months?

The graph appears to indicate that there was a significant increase in the number of books read from the time of the initial survey. Most impressive was the fact that not one student in the post survey indicated that they had read no books as compared to 40% of the students who read no books in the initial survey. The students who read no books migrated to the one to two book

category, or the three of more book category. Most encouraging was the category of three or more books where a growth of about 60% was noted.

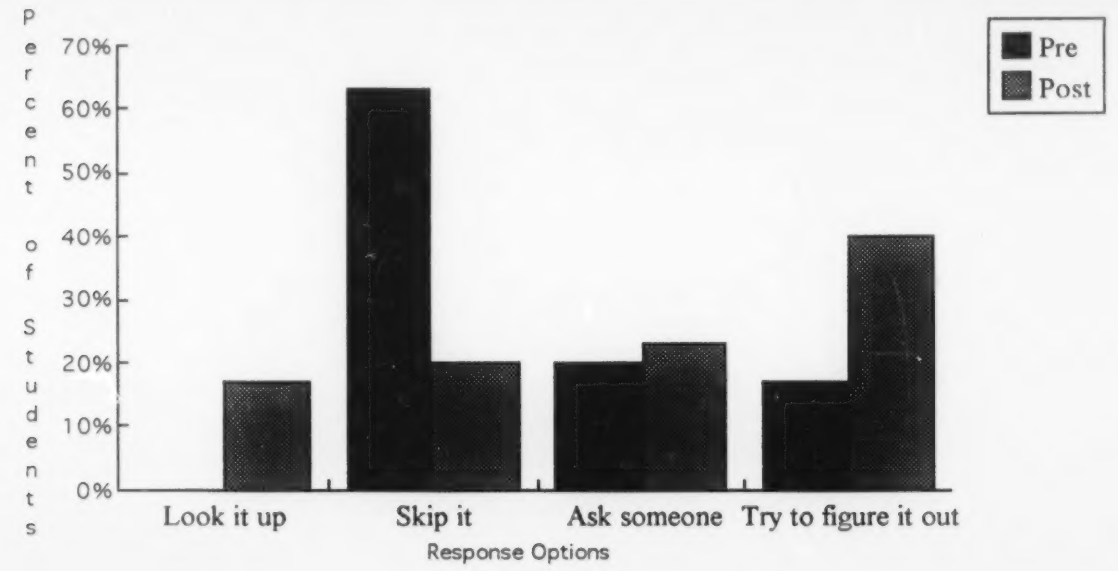

Figure 18. Student pre and post responses to survey question 2. When you are reading and you come upon an unknown word, which of the following do you usually do?

The graph appears to indicate that there was a significant increase in student use of a strategy to determine the meaning of an unknown word. This was supported by the fact that more students chose to look it up, ask someone, or try to figure it out. On the other hand, there was a notable decline in the number of students who chose to skip the word. Students who had previously elected to skip an unknown word declined from 63% in the initial survey to 20% in the post survey. Students responses that indicated the use of any strategy went from 37% in the initial survey to 80% in the post survey.

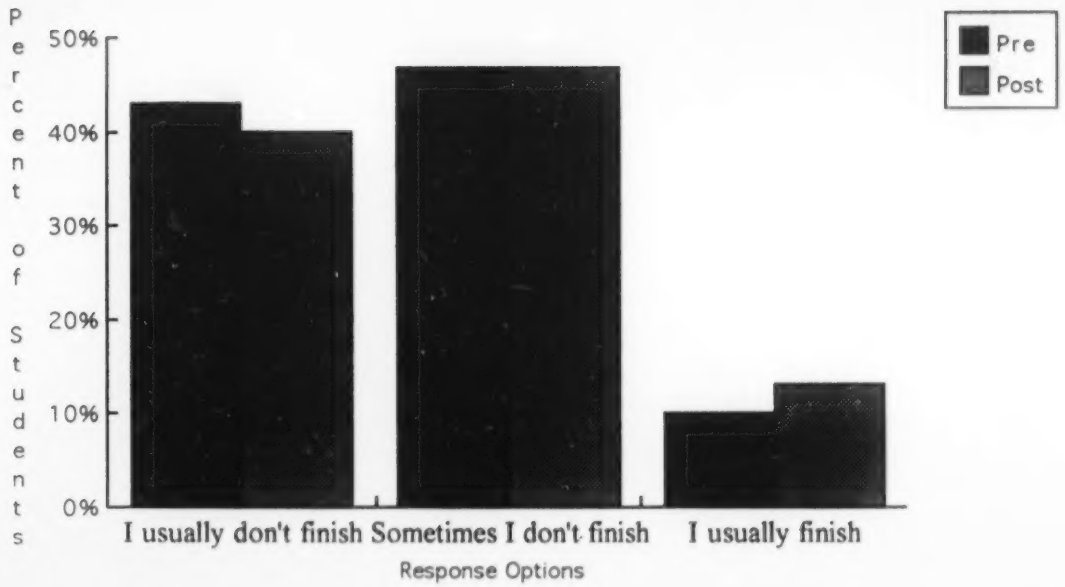

Figure 19. Student pre and post responses to survey question 3. When you are given a test or reading assignment that has to be finished in class and the teacher only gives you a certain amount of time, which of the following best describes you?

The graph appears to indicate no significant difference in the student responses from the initial survey to the post survey. In both of the cases where change in responses did appear, the difference was only three percentage points. Specifically, the students who responded that they usually finished, showed a 3% gain, and in the students who responded that they usually did not finish, showed a 3% loss.

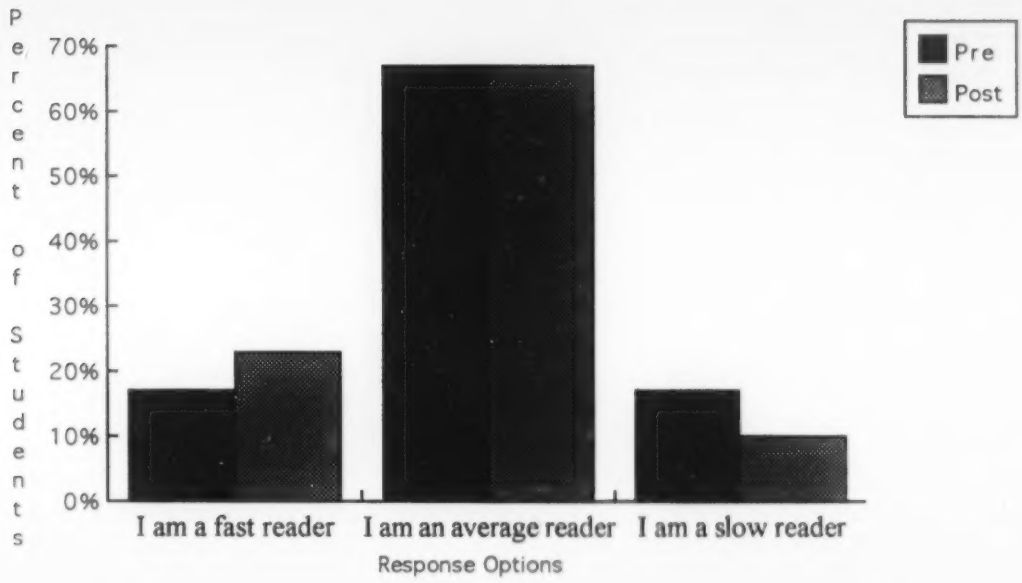

Figure 20. Student pre and post responses to survey question 4. Which of these best describes you?

The graph appears to indicate that there was a loss in the slow reader category and a gain in the fast reader category. The slow reader category showed a loss of 7% and the fast reader category showed a gain of 7%.

Conclusions and Recommendations

Based on the presentation and analysis of the data on reading deficiencies and their effects on student performance, some improvement was noted. Improvement was noted in the following areas: students demonstrated an ability to define unknown words in context; students saw reading as a fluid process, not a static one; students recognized that reading impacts the development of vocabulary and builds an experiential basis for comprehension; students demonstrated an increase in reading confidence; and students began to carry over good reading

practices to all other subjects. The intervention strategies that were targeted in this study had a measurable impact on student performance across the curriculum. However, little impact was noted from interventions that were designed to address the issue of rate. The following is a detail of the conclusions and recommendations.

The ability to define words in context was a strategy that was taught in language arts classes and students demonstrated the ability to use these strategies by successfully completing work sheets that directly tested that skill. Further, most students indicated on their post student survey that they now would choose some method for finding the definition of unknown words rather that to skip the word in text. Finally, when this skill was directly tested on the post skills test, a noticeable increase in the ability to find words in context was noted. These results would indicate that most students recognize the importance of using these strategies, and some students have made quantifiable gains in using this strategy.

Through the modeling of good reading practices, teachers in content area classes noted that students realized that reading was a fluid process and not a static process. Teachers in the content area subjects noted that students became more active readers by identifying unknown vocabulary, by questioning readings as they read, by demonstrating the ability to summarize text, and by reflecting on readings in journal entries. The student survey again supports this with students responding that they would use a word identification strategy rather than skip an unknown word in context. Further, the growth noted from the baseline mathematics and science vocabulary and comprehension tests to the post mathematics and science vocabulary and comprehension tests demonstrates students increased ability to define unknown words.

Teachers noted that students recognized that vocabulary was linked to comprehension, and that comprehension was linked to individual experiences. Again, our student survey question concerning skipped words in context supports the increased awareness of the importance of

vocabulary. Teachers of content area subjects noted that when students understood the vocabulary, they were more likely to involve themselves in questioning, summarizing, and reflection during the reading process. Finally, our student survey indicated an increase in the number of books read, which indicates a recognition of the importance of reading.

Students demonstrated an increase confidence in reading ability. This was only marginally reflected in the student survey when students were asked to appraise themselves as fast, average, or slow readers. However, teachers noted that students participated more in class discussion, and that that discussion was more lively and informed. Students showed progress in their ability to reflect on readings and to complete reading comprehension checks such clozes and two column notes.

Most satisfying of all the results was that students were applying good reading practices in content area subjects. Teachers noted that students actively sought out unknown words from text and employed some strategy to define the word before reading. During reading students questioned content and refined definitions. Finally, students were able to summarize content and reflect on what was learned. The students survey indicated that most students no longer skipped words in context. The baseline tests in science and mathematics showed an increase in student performance in the area of vocabulary and comprehension. The skills test demonstrated an increase in students ability to define words in context.

Unfortunately, little progress was noted in the area of reading rate. The failure to affect any quantifiable progress in this area was disappointing, but not surprising. The time frame for this study did not allow for enough time to impact reading rate. Although outside reading was encouraged and class time was devoted to independent reading, no measurable progress was seen on the post reading rate test when compared to the initial reading rate tests.

The teacher researchers have several recommendations as a result of this study. First, and

foremost, all teachers should see themselves as reading teachers. Reading is a process with skills that constantly need to be reinforced in all subject areas. Basic reading skills must be modeled, practiced, and taught by all teachers to effect good reading and comprehension. Teachers cannot assume that students in middle grades have mastered these basic reading skills and thereby ignore or leave any formal reading instruction to reading teachers alone. To meet this challenge all teachers need training in good practices.

Schools should provide all teachers with reading training. The ideal would be for all schools to insist on formal reading training for all teachers. Recognizing that this solution is probably unrealistic, schools could embark on an in service type training program. These in service programs could be offered by present reading staff on institute days. Schools could highlight this as a school improvement goal, as a professional goal for formal teacher evaluation, or as a way to meet the requirements for teacher recertification. However it is approached, all teachers must see this as a critical issue linked to student academic success.

Specifically, a teacher training program needs to address several issues. Teachers need to model good reading practice by introducing new vocabulary and helping student develop meaning as they read. Vocabulary comprehension needs to be assessed so as to ensure comprehension. Students need to be made to reflect on what is read so as to allow for the processing of and storing of the read information. Teachers need to read orally to students so as to guide them through the questioning and summarizing of the material. During the reading process teachers need to demonstrate a positive attitude towards reading; exemplifying reading as a joyful experience.

Additionally, teachers need to encourage reading, allow time for reading, and provide appropriate and varied reading materials. Teachers should insist on both structured and unstructured reading outside of class. The teaching environment should be rich with a variety of

reading materials, and students should be guided through the exploration of that material. Most importantly, students should be encouraged to read in school, and time should be set a side on a daily basis for them to do that.

Finally, reading has to be engaging and real. Teachers of reading should be a resource for all other teachers and vice versa. All teachers should view themselves as part of a team whose goal is to foster literacy. Reading truly is the key to academic success.

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Appendixes

Appendix A

Dear Parents or Guardian,

We are currently enrolled in a master's program through Saint Xavier University. The emphasis of this program is educational research, and we are presently involved in the data collection aspect of this project. The focus of our research is improving reading performance. We will, during the course of the next few months, be conducting surveys, analyzing test data, and observing students' reading habits and abilities. Our hope is that this study will allow us to further improve the delivery of reading instruction to your child.

All data will be anonymous and confidential. We are interested in the overall reading performance of the entire student population, rather than in an individual student's performance. No student will be singled out or graded on this study. The process will in no way interfere with the regular operation of any class.

Participation in this study is entirely voluntary, and students will feel no pressure, if you choose for them not to participate. We thank you for any consideration that you can give us in the pursuit of this goal. If, however, you would prefer that your child NOT PARTICIPATE in this endeavor, please sign and return the bottom portion of this sheet.

Sincerely,

Jo Ann Binotti
JoAnne Hamilton-Gunkel
Dorothy Sipple

I DO NOT WANT my child, _____to take part in this study.

_____ _____

Signature of Parent or Guardian Date

Appendix B

STUDENT READING SURVEY

Read the question and check the answer that describes you best.

1.) How many books have you read for enjoyment in the last two months?

0 _____

1-2 _____

3 or more _____

2.) When you are reading and you come upon an unknown word, which of the following do you usually do?

Look it up _____

Skip it _____

Ask someone _____

Try to figure it out by using other words in the sentence as clues _____

3.) When you are given a test or a reading assignment that has to be finished in a class and the teacher only gives you a certain amount of time, which of the following best describes you?

I usually don't finish _____

Sometimes I don't finish _____

I usually finish _____

4.) Which of these best describes you?

I am a fast reader _____

I am an average reader _____

I am a slow reader _____

Appendix C

Name _____ Period_____Date_____
SCORE _____/6 correct

Science Vocabulary and Comprehension - Baseline Test

Circle the correct answer.

1. What is the basis for arranging the elements in the periodic table?
   a. in alphabetical order
   b. in order of their atomic number
   c. in order of color
   d. in order according to the number of electrons

2. A period in periodic table is:
   a. a row across
   b. same column
   c. same atomic number
   d. same symbol

3. Noble gases are said to be inert or_____ due to the fact that they don't react easily with other elements.
   a. inactive
   b. active
   c. sleepy
   d. bonded

4. A family or group is in the same_____on the periodic table.
   a. column
   b. row
   c. element
   d. district

5. Each family in the periodic table has its own characteristics based on:
   a. their chemical property
   c. number of energy levels
   c. their physical property
   d. its number of valence electrons

6. Valence electrons are:
   a. involved in bonding
   b. the electrons farthest from the nucleus
   c. both a & b
   d. what adds mass to an atom

Appendix D

Mathematics' Baseline Vocabulary and Comprehension Test

Name_____

Period_____ Date_____ Score_____

Choose the term that best completes each statement.

1. 8x + 6 is an example of an _____ . (algebraic expression, inequality)
2. "For any numbers *a* and *b*, $a + b = b + a$" is a statement of the _____ property of addition. (commutative, associative)
3. An expression is _____ when it has no like terms and no parentheses. (an algebraic expression, in simplest form)
4. In (5, 6), 5 is the _____. (x-coordinate, y-coordinate)
5. The inverse operation for subtraction is _____. (addition, division)
6. A group used to present a larger population is a _____. (survey, sample)

Appendix E

Name:_____

Date:_____

Period:_____

Finding the meaning of words using context clues

Circle the word or words in the following sentences that help define the underlined word. Then, on your own paper, define, in your own words, the underlined word using context clues.

1.) During the Armistice, the soldiers laid down their arms while the leaders talked about peace.

2.) Because the city plans to ban fireworks, we won't set off sparklers this year.

3.) The teams began to brawl after the tense game.

4.) Nuclear power is a controversial issue because there are strong feelings both for and against it.

5.) Plans for the new playground will dispel fears that the city has forgotten about its parks.

6.) During the six weeks of the drought, not a drop of water fell.

7.) After what seemed like endless delays, the space shuttle finally took off.

8.) The epidemic of measles has closed the city's schools.

9.) A woman claims her special powers allows her to foretell the future of our planet.

10.) Immigration laws limit the number of foreign people who may move to the United States each year.

11.) Microwave ovens are a recent innovation.

12.) An invasion of thousands of fruit flies threatened the peach crop.

13.) Because the bomb caused irreparable damage, the building will be torn down.

14.) Representatives from every city in the state will participate in the discussion about pollution.

15.) The city is proud of the racial harmony that exists among its citizens of many different cultures.

16.) During the rebellion, the castle was attacked by those who opposed the king's policies.

17.) The significance of the new fertilizer is that twice as much corn can be grown on an acre.

18.) When the climbers reached the summit, they planted their country's flag on the mountaintop.

19.) Only one survivor lived to tell the story of the airplane crash.

20.) The newspaper's unbiased report listed the good and bad points of each candidate.

Name:_____

Date:_____

Period:_____

EXERCISE 1

Now, complete the following exercises to demonstrate your understanding of the definitions. Circle the correct response.

1.) The _____ of many nationalities has given America a unique flavor.

A.) survivor B.) immigration C.) summit D.) significance

2.) No one could _____ who would win the war.

A.) foretell B.) epidemic C.) armistice D.) participate

3.) Signing the _____ brought a halt to the fighting in the four-year border dispute.

A.) drought B) epidemic C.) armistice D.) significance

4.) Many _____and ethnic groups live side-by-side in our city.

A.) racial B.) irreparable C.) endless D.) unbiased

5.) Although the newspaper claims that the damage to the theater is _____ the owners have ordered repairs to begin immediately.

A.) irreparable B.) unbiased C.) racial D.) controversial

6.) To _____ rumors of a plant closing, the manager announced that additional employees would be hired.

A.) brawl B.) participate C.) ban D.) dispel

7.) The _____ of the fire suffered third degree burns.

A.) invasion B.) survivor C.) drought D.) armistice

8.) The press secretary will _____ all reporters from the meeting.

A.) ban B.) brawl C.) foretell D.) participate

9.) During the flu _____, over half of the office staff was absent from work.

A.) rebellion B.) drought C.) armistice D.) epidemic

10.) The farmers could not protect their fields from the unexpected _____ of locusts.

A.) drought B.) summit C.) invasion D.) armistice

11.) Since the angry fans may _____ after the game, security guards are stationed.

A.) ban B.) brawl C.) foretell D.) dispel

12.) The army planned a(n) _____ against the government in power.

A.) immigration B.) survivor C.) rebellion D.) drought

13.) The world was shocked by the country's refusal to _____ in the Olympic Games.

A.) ban B.) participate C.) foretell D.) dispel

14.) The _____ of the meeting s indicated by the number of reporters outside the door.

A.) drought B.) survivor C.) significance D.) epidemic

15.) A new hand-held device that measures blood pressure is a(n) _____in home health care.

A.) epidemic B.) invasion C.) rebellion D.) innovation

Name:_____

Date:_____

Period:_____

Finding the meaning of words using context clues

Circle the word or words in the following sentences that help define the underlined word. Then, on your own paper, define, in your own words, the underlined word using these clues.

1.) You should appease your thirst with water rather than with carbonated drinks.

2.) There is little difference in the cost because the two insurance plans have comparable rates.

3.) Daphne will devote twenty minutes every morning to her exercise program.

4.) The effect of Wen's healthy diet should be an increase in energy.

5.) Flora wins short distance races, but does not have the endurance to run marathons.

6.) Many people claim that exercise makes them feel more energetic, rather than fatigued.

7.) The doctor's knowledge of hygiene helped him stop the epidemic.

8.) Because his immunity to disease is low, he catches colds easily.

9.) Because of the inadequate supply of measles vaccine, some children will not be vaccinated.

10.) Because she is a vegetarian, Sara will ingest no red meat.

11.) Her body was so limber that she could do back bends and splits with ease.

12.) Janna's new diet limits her to a maximum of three small meals a day.

13.) For nourishment they brought carrots and peanuts along on the hike.

14.) If you omit the salad from tonight's menu, we won't have a green and leafy vegetable.

15.) The daily requirement for vitamin C can be fulfilled by eating a variety of citrus fruits.

16.) On the mountain hike, respiration became more difficult as the air became thinner.

17.) The athletes were exhausted by the rigorous schedule of three practices a day.

18.) The busy executive said that she would go crazy without quiet weekends in the country to keep her sane.

19.) Because she needs more iron, she will supplement her diet with iron tablets.

20.) He worked with such energy and vigor, it was clear he was fully recovered from the flu.

Name:_____

Date:_____

Period:_____

EXERCISE 1

Now, complete the following exercises to demonstrate your understanding of the definitions. Circle the correct response.

1.) Coming to practice every day was a strict _____ of the track team.

A.) hygiene B.) effect C.) requirement D.) maximum

2.) The athletes were told to _____ their diets with extra vitamins and minerals.

A.) supplement B.) appease C.) omit D.) ingest

3.) The swimmer had a great _____ and did not tire easily.

A.) effect B.) endurance C.) respiration D.) immunity

4.) The relationship between emotional and physical health is described in the saying, "a _____ mind and a healthy body".

A.) sane B.) limber C.) comparable D.) rigorous

5.) A basic course in _____ will teach you how to maintain your good health.

A.) endurance B.) immunity C.) maximum D.) hygiene

6.) Lack of sleep can lower your _____ to contagious diseases.

A.) maximum B.) requirement C.) immunity D.) nourishment

7.) She has become quite _____ after ten minutes of stretching every morning.

A.) comparable B.) sane C.) rigorous D.) limber

8.) While the ankle is healing, she can only run a _____ of two miles a day.

A.) effect B.) hygiene C.) maximum D.) respiration

9.) There is more real _____ in an apple than in a sack of potato chips.

A.) hygiene B.) nourishment C.) endurance D.) respiration

10.) According to the _____ training schedule, the gymnasts will be practicing six hours a day.

A.) rigorous B.) limber C.) sane D.) comparable

EXERCISE 2

Circle the word that most nearly has the same meaning as the first word

11.)	Omit	A.)	permit	B.)	exclude
		C.)	accuse	D.)	seem
12.)	Devote	A.)	dedicate	B.)	believe
		C.)	take	D.)	lead
13.)	Vigor	A.)	sleepiness	B.)	truth
		C.)	energy	D.)	permission
14.)	Comparable	A.)	similar	B.)	believable
		C.)	peaceful	D.)	predictable
15.)	Energetic	A.)	bored	B.)	large
		C.)	polluted	D.)	lively
16.)	Ingest	A.)	exceed	B.)	choke
		C.)	eat	D.)	hurry
17.)	Appease	A.)	join	B.)	allow
		C.)	satisfy	D.)	accumulate
18.)	Inadequate	A.)	slow	B.)	insufficient
		C.)	soft	D.)	healthy

19.)	Respiration	A.)	ache	B.)	appetite
		C.)	perspiration	D.)	breathing
20.)	Effect	A.)	result	B.)	permission
		C.)	opening	D.)	cause

Name:_____

Date:_____

Period:_____

Finding the meaning of words using context clues

Circle the word or words in the following sentences that help define the underlined word. Then, on your own paper, define, in your own words, the underlined word using these clues.

1.) Although a rag will soak up water, absorption will be greater if you use a sponge.

2.) When he was an aeronautical engineer, he designed planes

3.) Her studies of aerospace convinced her to become an astronaut.

4.) If you analyze water, you will find that it is made of oxygen and hydrogen.

5.) Biological sciences are concerned with living things.

6.) When studying biophysics, she learned how the body retains heat.

7.) The leaves will decompose over time and can be used as fertilizer.

8.) Through distillation, it is possible to separate salt from sea water.

9.) The volcano was dormant for fifty yeas between its eruptions.

10.) The geological team examined the layers of rock to determine when the mountain was formed.

11.) Our inquiry about the science lab was answered promptly.

12.) We assume that space is infinite because no one has proven that it has boundaries.

13.) Use the microscope to magnify the mosquito larva so that you can see it more clearly.

14.) Through the huge telescope at the observatory, the stars seem very close.

15.) The ozone in the upper layer of the earth's atmosphere filters out harmful ray.

16.) The realm of science includes chemistry and astronomy.

17.) A scientific experiment requires close observation and careful recording of information.

18.) During the flight simulation, pictures and sounds made the astronaut feel as if he were piloting a real rocket.

19.) Each specimen represents a different family of insect.

20.) Water will vaporize and turn to steam when heated.

Name:_____

Date:_____

Period:_____

EXERCISE 1

Now, complete the following exercises to demonstrate your understanding of the definitions. Circle the correct response.

1.) At the _____ we heard a lecture about the moon.

A.) simulation B.) observatory C.) biophysics D.) aerospace

2.) When we studied _____, we learned about the strength and durability of bones.

A.) ozone B.) inquiry C.) absorption D.) biophysics

3.) An _____ engineer must know many things about airplanes and flight.

A.) geological B.) aeronautical C.) biological D.) dormant

4.) The law of gravity is a _____ theory.

A.) scientific B.) infinite C.) biological D.) dormant

5.) Study of the _____ of light by different materials has helped us understand how colors are produced.

A.) aerospace B.) absorption C.) observatory D.) realm

6.) The _____ researcher predicted the earthquake.
A.) geological B.) infinite C.) biological D.) aeronautical

7.) The layer of _____ that surrounds our planet is very important to our survival.

A.) realm B.) aerospace C.) ozone D.) simulation

8.) The _____ science can teach us about the animals that share the planet with us.

A.) aeronautical B.) biological C.) geological D.) magnified

9.) If the gasoline spills, it may _____ and become highly explosive.

A.) decompose B.) analyze C.) vaporize D.) magnify

10.) A career in _____ requires an understanding of how a spacecraft acts in the space beyond our atmosphere.

A.) aerospace B.) absorption C.) inquiry D.) realm

EXERCISE 2

Circle the response that most nearly has the same meaning as the first word.

11.)	Simulation	A.)	imitation	B.)	actuality
		C.)	fact	D.)	existing
12.)	Analyze	A.)	ignore	B.)	disregard
		C.)	overlook	D.)	examine
13.)	Inquiry	A.)	response	B.)	question
		B.)	retort	D.)	reply
14.)	Specimen	A.)	rock	B.)	type
		C.)	class	D.)	sample
15.)	Dormant	A.)	smooth	B.)	hurried
		C.)	inactive	D.)	fantastic
16.)	Infinite	A.)	endless	B.)	proven
		C.)	alone	D.)	less

17.)	Realm	A.)	area	B.)	food
		C.)	king	D.)	idea
18.)	Magnify	A.)	feed	B.)	pour
		C.)	cut	D.)	enlarge
19.)	Distillation	A.)	disease	B.)	purification
		C.)	force	D.)	color
20.)	Decompose	A.)	race	B.)	sleep
		c.)	decay	D.)	freshen

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		c.)	decay	D.)	freshen

Name:_____

Date:_____

Period:_____

Finding meaning of words using context clues

Circle the word or words in the following sentences that help define the underlined word. Then, on your own paper, define, in your own words, the underlined word using these clues.

1.) The political agitator turned the crowd against the speaker.

2.) In a communist country, all property belongs to the state.

3.) The European states were organized into a confederacy to encourage trade.

4.) There were heated discussions when the leaders of the five countries met to confer about world affairs.

5.) The senator tried to speak for each constituent in his state.

6.) The decline of the king's power meant that he no longer had the authority to raise taxes.

7.) Two men and three women were in the delegation that the country sent to the peace conference.

8.) Having too many houses available will depress the housing market.

9.) The dictator had final say in all decisions.

10.) The agency in charge of food distribution sent food to needy countries.

11.) The poet was an emigrant who left his country for political reasons.

12.) In equatorial Africa the weather is very hot.

13.) The incumbent will run for another term in office.

14.) World peace depends on how many countries interact with each other.

15.) If the government agrees to naturalize the girl from Mexico, she will become an American citizen.

16.) The politician promised her supporters that she would lower taxes if elected.

17.) During the presidential address, the president outlined his new plan for education.

18.) The tariff on the car from Japan made it more expensive.

19.) The country's territorial waters included any part of the ocean within one hundred miles of its shoreline.

20.) If the president should veto the bill, it will not become law.

Name:_____

Date:_____

Period:_____

EXERCISE 1

Now, complete the following exercises to demonstrate your understanding of the definitions. Circle the correct response.

1.) In the United States, a _____ election is held every four years.

A.) depressive B.) presidential C.) communist D.) equatorial

2.) In Washington, there is a special ceremony to _____ new citizens.

A.) confer B.) interact C.) naturalize D.) veto

3.) After hearing the rousing speech of the _____, the crowd became excited and demanded action from the government.

A.) tariff B.) agitator C.) confederacy D.) decline

4.) The country had _____ rights in area near its borders.

A.) communist B.) presidential C.) equatorial D.) territorial

5.) If the two leaders can _____well together, they will work on joint projects in the future.

A.) interact B.) veto C.) naturalize D.) depress

6.) After she left her native country, the _____ felt lost.

A.) emigrant B.) dictator C.) incumbent D.) tariff

7.) The tribes in the Indian _____ agreed to hunt only in special areas.

A.) agitator B.) constituent C.) confederacy D.) politician

8.) The mayor assured his _____ that he would try to improve the bus program.

A.) emigrant B.) politician C.) tariff D.) constituent

9.) All the candidates belonged to the same party in the _____ country's election.

A.) equatorial B.) communist C.) presidential D.) territorial

10.) The _____ had held the office for ten years.

A.) tariff B.) delegation C.) incumbent D.) emigrant

EXERCISE 2

Circle the response that most nearly has the same meaning as the first word.

11.)	Tariff	A.)	sheriff	B.)	tax
		C.)	fine	D.)	location
12.)	Confer	A.)	talk	B.)	dance
		C.)	affect	D.)	allow
13.)	Depress	A.)	lower	B.)	correct
		C.)	find	D.)	try
14.)	Veto	A.)	hang	B.)	form
		C.)	back	D.)	reject
15.)	Dictator	A.)	entertainer	B.)	follower
		C.)	ruler	D.)	driver
16.)	Delegation	A.)	light	B.)	committee
		C.)	election	D.)	host
17.)	Politician	A.)	maid	B.)	announcer
		C.)	senator	D.)	assistant

18.)	Equatorial	A.)	single	B.	tropical
		C.)	arctic	D.)	wet
19.)	Distribution	A.)	price	B.)	mark
		C.)	delay	D.)	division
20.)	Decline	A.)	decrease	B.)	seek
		C.)	háve	D.)	inform

Appendix F

Science Vocabulary and Comprehension Test 1

1. Which of the following chemical families make up approximately 85% of the elements on the periodic chart ?

a. Nonmetals
b. Noble gases
c. Halogens
d. Metals

2. Luster or shininess is a _____ property of metals.

a. chemical
b. physical
c. general
d. specific

3. Many metals can be used in jewelry making because they are_____.

a. malleable
b. ductile
c. dense
c. shiny

4. Ductile is a physical property that means that the element can be_____.

a. hammered into thin sheets
b. dull
c. drawn into wires
d. shiny

5. _____ are elements that have the properties of metals, as well as nonmetals.

a. halogens
c. metalloids
c. rare earth
d. noble gases

6. Noble gases are called " inert" due to the fact that they are _____.

a. nonreactive
b. reactive
c. do not combine with other elements
d. both a and c

Science Vocabulary and Comprehension Test 2

1. _____ are scientists that study the processes that create Earth's features and search for clue's about earth's history.
   a. Biologist
   b. Virologist
   c. Chemist
   d. Geologist

2. An equation to represent the relationship between density, mass and volume is
   a. M=D+V
   b. D=M/V
   c. M+V=D
   d. V=M/D

3. The layers of the earth are the _____.
   a. core,gases, and rock
   b. crust and rock
   c. core, crust and mantle
   d. mantle and core

4. Scientists rely on indirect evidence to learn about the interior of the earth. This evidence includes studying _____.
   a. seismic waves
   b. caves
   c. surface rocks
   d. chemistry

5. The layer of the earth that is solid and rigid is the_____.
   a. asthenosphere
   b. core
   c. lithosphere
   d. mantle

6. When a spoon you are using to stir soup on the stove becomes hot, this illustrates the concept of heat transfer by the process of_____.
   a. convection
   b. indirect heating
   c. conduction
   d. melting

Science Vocabulary and Comprehension Test 4

1. The seismic waves that travel along the Earth's surface and produce the most severe ground movements are _____.

a. Primary waves
b. Seismic waves
c. Secondary waves
d. Surface waves

2. Geologists determine earthquake risk by locating where _____ are active.

a. Seismic waves
c. Epicenters
c. faults
d. S waves

3. Before lava reaches the surface it is called _____.

a. Rock
d. Volcanic ash
c. Magma
d. Liquid fire

4. Which of the following helps to determine how easily magma flows?

a. the amount of silica in the magma
b. the diameter of the pipe
c. the size of the crater
d. the density of the magma

5. Which provides the force that causes magma to erupt to the surface?

a. the silica in the magma
b. dissolved gases trapped in the magma
c. gravity in the lithosphere
d. the density of the magma

6. An earthquake on the ocean floor can produce a _____, which may grow into a huge wave as it approaches the shore.

a. Seismic waves
b. Tsunami
c. Caldera
d. Lava plateau

Science Vocabulary and Comprehension Test 3

1. The undersea mountain chain where new ocean floor is produced is the _____

   a. hot spot
   b. trench
   c. mid-ocean ridge
   d. sea-floor spreading

2. Most scientists rejected Wegener's theory of continental drift because the theory failed to explain _____.

   a. coal deposits in Antartica
   b. climate changes
   c. formation of mountains
   d. how the continents move

3. A _____ is any trace of an ancient organism that has been preserved.

   a. bone
   b. teeth
   c. fossil
   d. gem

4. The process that powers plate tectonics is_____.

   a. radiation
   b. conduction
   c. convection
   d. subduction

5. _____ is the process by which the ocean floor sinks back into the mantle.

   a. density
   b. addition
   c. sonar
   d. subduction

6. Subduction of the ocean floor takes place at _____.

   a. the lower mantle
   b. rift valleys
   c. mid-ocean ridges
   d. trenches

Appendix G

Mathematics' Vocabulary and Comprehension Test 1

Name_____

Period_____ Date_____ Score_____

Choose the letter of the term that best matches each statement or phrase.

_____1. the four regions separated by the axes on a coordinate plane.	a. absolute value
_____2. an integer and its opposite	b. integers
_____3. the distance a number is from the zero point on the number line	c. quadrants
_____4. positive and negative whole numbers	d. coordinate
_____5. the number that corresponds to a point on a number line	e. graph
_____6. a dot places at the point named by the ordered pair	f. additive inverses

Mathematics' Vocabulary and Comprehension Test 2

NAME_____

PERIOD_____

Factors are numbers that when_____ together give a product. Numbers that have 2 as a factor also are divisible by 2. Numbers that are divisible by 2 end in an _____ number. Numbers that are divisible by 5 end in _____or _____. Numbers that are divisible by _____ end in zero.

6^2 The 6 is called the base and the 2 is called the _____. This means that 6 is used as a factor _____ times, and is equal to _____. To represent this number, you could picture a square the has a length and width of _____.

Mathematics Vocabulary Test 3

Name_____

Period_____Date_____ Score_____

Determine whether each statement is *true* or *false*.

1._____When two numbers that are additive inverses of each other are added, the sum is zero.

2._____The division property of inequality says that if you divide both sides of an inequality by the same number, the order of the inequality symbol must be reversed.

3._____The coordinates of the points on a number line are greater as you move from right to left.

4._____The area of a geometric figure is the measure of the surface it encloses.

5._____A solid dot on a number line indicates that the point is included in the solution set.

6._____The perimeter of a geometric figure is the distance around it.

Mathematics' Vocabulary and Comprehension Test 4

Name_____

Period_____Date_____ Score_____

Complete each statement:

1. The greatest integer that is a factor of each of two or more integers is called their_____.
2. Numbers that are expressed using exponents are called_____.
3. The _____of a whole number divide that number with a remainder of zero.
4. A_____is a whole number greater than one that has exactly two factors, 1 and itself.
5. The product of a number and any whole number is called a _____of the original number.
6. _____is writing numbers using place values and exponents.
7. The least common multiple of the denominator of two or more fractions is called the _____.
8. A_____is an integer, a variable, or a product of integers or variables.
9. A comparison of two numbers by division is called a_____.